

2010 Fiber Optic Training Catalog



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The Very Best in Fiber Optic Training

We are the Leader in Fiber Optic Training

Since 1987, The Light Brigade has trained more than 35,000 technicians, installers, engineers, and designers from a wide variety of industries: telephony, broadband cable, utilities, media broadcast, industrial, manufacturing, mining, government, aerospace, along with the various branches of the military.

Whether your application is a long-distance DWDM network, a small local telephone network, a complex fiber to the home network, a sophisticated military facility, or an undersea oil exploration site, The Light Brigade can provide critical training for your personnel to lower operating cost and improve installation efficiency.



Instructors

Our professional instructors and technicians are technically skilled and have a variety of real world practical experience in all aspects of fiber optics. With experience in applications such as communications, signaling, security, and network control, our instructors provide valuable insight into the design, installation, and operation of state-of-the-art fiber optic systems.

Hands-on Training

By having extensive hands-on sessions in each training class, our attendees learn fiber optics by doing rather than by watching. Attendees spend class time building, testing, or troubleshooting an actual fiber optic system. In each of our courses, the ratio of students to instructors during the hands-on sessions assures that there is direct personal interaction and attention to each student.

Technology-based

In our training classes, you receive an objective viewpoint, not a sales pitch. We teach fiber techniques that are applicable to any product, and select the best available equipment and supplies from many different manufacturers. You can choose to develop your skills using our state-of-the-art equipment and accessories, or bring your own to learn how to use it more effectively.

Relevant

Our course materials are constantly updated to stay in step with current and emerging technologies. All of our materials and techniques are written and taught based on the latest standards, recommendations, and codes from ANSI, ITU, TIA/EIA, IEEE, IEC, Telcordia, and others.

Continuing Support

To assure continued long-term support, we offer technical assistance to our class attendees. If you have a question or need help after the class is over, our staff is there to help.

Certification Options

Light Brigade Certificate of Completion

Everyone who completes one of our courses will receive a Light Brigade Certificate of Completion, signed by the course instructor. This certificate specifies the content and total number of instructional hours for both the classroom and hands-on portions and is traceable to the class attended.

Third-party Certifications

Many of our classes are eligible for independent certifications through third-party industry organizations and groups. These certifications are typically progressive levels and show competency in hands-on skills and technical knowledge. See individual course details for more information.



Electronics Technicians Association (ETA)



International Municipal Signal Association (IMSA)



Fiber Optic Association (FOA)



Building Industry Consulting Service International, Inc. (BICSI)

Fiber Optics 1-2-3

Design – Installation – Maintenance

Course Objective

To provide a practical understanding of fiber optic communication systems and the skills required to properly design, install, and maintain fiber optic networks. Students will use the latest fiber optic technology and equipment to learn how to splice, connectorize, test, and troubleshoot optical fiber networks in order to increase efficiency, reliability and on-the-job safety as well as reduce costs and downtime.

Course Level

Introductory to intermediate. Beginners to experienced fiber technicians find the class and extensive hands on skills training beneficial.

Course Options

Four days – Classroom lecture and hands-on exercises.

Two days – Classroom only. Ideal for designers and planners.



COURSE FEES

- Four-day course \$1595
- Two-day course \$800
- Optional ETA Fiber Optic Installer Exam \$150

Certification

ETA Fiber Optic Installer



Complete the four-day Fiber Optics 1-2-3 course and pass the ETA Fiber Optic Installer (FOI) certification exam. The FOI is designed for those working with both multimode and singlemode fibers.

Day 1 Classroom (8 Hours)	Day 2 Classroom (8 Hours)	Days 3-4 Hands-On (16 Hours)
PHYSICAL PLANT <hr/> Introduction to Fiber Optics Standards Terminology <hr/> Fiber Theory/Optical Fibers Singlemode Multimode New Generation Fibers Cables Indoor/Outdoor Special Types <hr/> Connectors Specifications Singlemode Connectors Multimode Connectors SFF Connector Styles Connectorization Techniques Connector Polishes and Reflection Issues Attenuators and Terminators <hr/> Splicing Fusion Mechanical Cleaving Tools <hr/> Cable Management Patch Panels Splice Panels Distribution Panels LAN Panels Splice Closures Hubs and Pedestals	DISCIPLINES <hr/> Installation Outside Plant Underground / Aerial Premises / LAN <hr/> Test Equipment and Testing Theory Operation and Application Documentation <hr/> Restoration Planning Outside Plant Premises Emergency Restoration <hr/> Safety <hr/> Design Sources / Detectors Repeaters / Amplifiers Optical Amplifiers Passive Devices WDM / DWDM / CWDM System Design Loss Budgets Integration Standards <hr/> Systems Overview Topologies Ethernet HDTV / CATV / CCTV SONET / ATM FTTx PON	TRAINING LABS AND CERTIFICATION TESTING <hr/> Safety Meeting <hr/> Station #1 – Splicing Fusion / Mechanical / Pigtail Fiber Handling Fiber Cleaving <hr/> Station #2 – Connectorization Building SC and ST Jumpers Review of 1.25 SFF Connectors Visual Inspection / Cleaning Cable Assembly Testing <hr/> Station #3 – Cable Preparation Loose Tube Cables Distribution / Breakout Cable Patch Panel Preparation Splice Closure Preparation Mid-Entry Practices <hr/> Station #4 – OTDR Operation Acceptance Testing Span Acceptance / Splice Loss Reflection Testing Emergency Restoration Troubleshooting Documentation / Records <hr/> Station #5 – Optical Loss Testing Link Loss Measurement Transmit and Receive Power Identifiers and Tracers Reflection Testing Variable and Fixed Attenuators Documentation / Records

“The course was presented in a way that both experienced and new installers/technicians could come away with something gained. It was not below or above anyone.” – Jim Inman, MICHELS COMMUNICATIONS

Advanced Hands-on Modules

Course Objective

To provide the next level of training for those who require more advanced skills and experience with major fiber optic disciplines. Course material is predominantly based on singlemode fiber technology and includes content applicable for FTTx and DWDM systems.

Course Level

Intermediate to expert. This series of classes requires basic knowledge of fiber optic theory and terminology and field experience such as the Fiber Optics 1-2-3 course, or equivalent formal training.

Course Options

Each module is one day in duration and can be taken individually, or as a combination of various modules. You choose which modules best address your training needs!

Module 1 – Fiber Optic Cable Preparation, Patch Panels and Splice Closures

Learn how to work with different optical cable structures used in indoor and outdoor applications. Properly prepare splice closures, patch panels, and splice trays in our new cable labs. Learn how to perform an express (or mid-entry) into cables. Perfect your skills using breakout and fanout kits and learn when to use them. In this module, you can investigate a variety of cable preparation tools and learn which work best for your applications.

Module 2 – Fiber Optic Connectorization

Learn the latest connecting technology, techniques, and test equipment. We teach you how to increase your yield and get better performance from your terminations. Through extensive hands-on training you will terminate and test various styles of fiber optic connectors used in both multimode and singlemode applications from the factory to the field.

Module 3 – Optical Loss Testing, Troubleshooting & Documentation

Effective testing involves not only knowledge of the equipment involved, but the skills required to test and troubleshoot optical links. Become skilled with optical loss testing, system testing, troubleshooting, and techniques that will benefit your applications every day. Other advanced topics include reflection and optical return loss testing.

Module 4 – OTDR Theory, Operation and Emergency Restoration

Operating an OTDR is more than pressing buttons. You need to understand OTDR theory and how it applies in the real world. Gain the knowledge and experience required for test acceptance, maintenance and restoration. Test multiple categories of singlemode and multimode fiber. We welcome you to bring in your own OTDR for enhanced training on your equipment.

Module 5 – Fiber Optic Splicing (Fusion and Mechanical)

Perform fusion and mechanical splicing for singlemode and multimode applications. Clean, cleave, and splice multiple fiber types quickly and correctly using both V-groove and core alignment fusion splicers. It covers inline, pigtail, and techniques for both single strand and ribbon splicing.

Certification

ETA Fiber Optic
Technician—
Outside Plant



Complete all five days of the Advanced Hands-on Modules course and pass the ETA Fiber Optic Technician—Outside Plant (FOT-OSP) certification exam. The FOT-OSP is designed for those installing outside plant singlemode fiber optic networks.



COURSE FEES

- Individual Modules \$500
- Five-day Course \$1650
- Optional ETA Fiber Optic Technician—OSP Exam \$150

“...an excellent job instructing. All questions were answered. These instructors did a superb job ensuring that I understood the material before the end of the day. The class was a lot better organized and taught in a level I could understand.” – Ken Reynolds, SKAGIT VALLEY CASINO

Fundamentals of Fiber Optics

Course Objective

To provide the knowledge and hands-on skills necessary to properly design, install, and maintain premises-based fiber optic communication systems and the latest in fiber optic local area network (LAN) technology. This course will help to increase efficiency, reliability and on-the-job safety as well as reduce maintenance and troubleshooting costs. Extensive hands-on training provides exposure to optical fiber termination, system testing and troubleshooting, and fusion splicing.

Course Level

Introductory to intermediate. Beginners to experienced fiber technicians find the class and extensive hands-on skills training beneficial.



COURSE FEES

- Two-day Course \$1200
- Optional FOA CFOT or AFOT Exam \$60

Certification

FOA Certified Fiber Optic Technician

FOA Advanced Fiber Optic Technician



Complete the two-day Fundamentals of Fiber Optics course and pass the Fiber Optic Association's Certified Fiber Optic Technician (CFOT) or Advanced Fiber Optic Technician (AFOT) exam.

Day 1 Classroom (8 Hours)

Introduction to Fiber Optics

Development Timeline
Advantages of Optical Fiber Media

Fiber Optic Transmission Theory

Structure of Optical Waveguides
Types of Optical Fibers
Basic Fiber Parameters
Operating Wavelengths

Optical Fiber Manufacturing

Fiber Optic Cable Technology

Cable Design Objectives
OSP Cables and Loose Buffer Protection
ISP Cables and Tight Buffer Protection

Fiber Optic Cable Installation Methods

Comparison to Metallic Cable
Basic Installation Parameters
Underground, Aerial and Direct Buried Installations

Termination and Splicing of Optical Fiber

Connector Types
Installation Methods
Field Installable versus Factory Termination
Splicing Methods

Field Testing and Troubleshooting

Types of Field Tests
Visual Continuity and Connector Inspection
Insertion Loss Test Measurements
Optical Time Domain Reflectometer Testing

Standards and Codes

System Design Parameters

Insertion Loss Values
System Dynamic Range
Restoration Margin

Day 2 Hands-on (8 Hours)

TRAINING LABS AND CERTIFICATION TESTING

Safety Meeting

Station #1 – Fiber Optic Cable Preparation

Loose Tube Cable Preparation
Tight Buffer Cable Preparation
Fan-Out Kit Installation
Pulling Grip Set Up

Station #2 – Fusion Splicing

Fiber Cleaning and Preparation
Fiber Optic Cleaving Process
Core Alignment Splicers
V-groove Alignment Splicers
Splicing 250- μ m to 900- μ m Fiber
Equipment Maintenance and Cleaning

Station #3 – Fiber Connectorization

Fiber Cleaning and Preparation
Anaerobic (Epoxy) Field Connector Installation
Cleave and Crimp Field Connector Installation
250- μ m Fiber Fan Termination
900- μ m Tight Buffer Termination
2-mm and 3-mm Cordage Termination

Station #4 – Field Testing and Troubleshooting

Cleaning Connectors
Evaluation of Connector End Face
Continuity Test with Visual Fault Locator
Bi-Directional Insertion Loss Methods
Mode Filter of Multimode Systems
Bi-Directional OTDR Traces
OTDR Event Analysis
Compute Link Loss Budget and Test Acceptance

"This course went beyond my expectations. This was my first exposure to fiber optics and it brought me completely up to my expectation of being able to talk to my customers and know what products to look at buying." – Gary Weber, G N REPAIR & TECHNOLOGY

FTTx for Installers & Planners

Course Objective

To provide the knowledge and practical skills required to be able to design, install, test, and maintain Fiber to the User (FTTx) networks.

Students will gain a practical understanding of the unique nature of FTTx networks, including how to test splitters, reflectance levels and bidirectionally test upstream and downstream traffic using WDM and CWDM technologies.

Course Level

Introductory to intermediate. Beginners to experienced fiber to the home technicians find the class and extensive hands on skills training beneficial.

Course Options

Four days – Classroom lecture and hands-on exercises.

Two days – Classroom only. Ideal for FTTx designers and planners.

Four days with CBT – Classroom, hands-on exercises, and FTTx/PON computer-based training (CBT) on CD-ROM.



COURSE FEES

- Four-day course \$1595
- Two-day course \$800
- Four days with CBT \$1695
- Optional FOT-OSP Exam \$150

Certification

ETA Fiber Optic Technician—Outside Plant



Complete the four-day FTTx for Installers and Planners course and pass the ETA Fiber Optic Technician—Outside Plant (FOT-OSP) certification exam. The FOT-OSP is designed for those installing outside plant singlemode fiber optic networks.

Days 1–2 Classroom (16 Hours)

FTTx/PON Introduction

Fiber Optic Basics
Standards & Standards Groups

FTTx/PON Methodology

BPON / EPON / GPON
TDM and TDMA
Triple Play (Voice, Video, Data)
SONET / ATM / Ethernet

Systems

FTTx / FTTH / FTTB / FTTP
FTTC / HFC / RFOG
Active Ethernet

ODN and OSP

Fiber Theory

Optical Fiber
Fiber Specifications
Singlemode Fiber (ITU G.652)

Optical Cable

Cable Design and Structure
Loose Tube / Ribbon
Central Tube / Stranded
Distribution and Drop Cables
Indoor/Outdoor Cables

Connectors

Types and Polishes

Splicing

Fusion / Mechanical
Ribbon / Pigtail / Inline

Splitters

FBT / Planar
Applications and Challenges

Panels, Closures and Cabinets

Patch / Distribution / Splice
Entrance Enclosures
Fiber Distribution Hubs
and Pedestals
Splice Closures

WDM in FTTx Applications

Transmitters and Lasers

Receivers and Photodetectors

OLTs and ONTs

OLT / ONT / UNI / UPS
Working with Lasers

Designing the PON

Loss Budgets and Classes
Exercises

Cable Installation

Direct Burial / Duct / Aerial
Codes and Specifications
Termination Options

Testing the PON

OTDR Testing
Optical Loss Testing
Testing Splitters
Fiber Identifiers
Visual Tracers
Documentation

Maintenance and Restoration

Typical Causes of Failure
Troubleshooting Techniques
Emergency Restoration
Planning

Days 3–4 Hands-on (16 Hours)

TRAINING LABS AND CERTIFICATION TESTING

Safety Meeting

Station #1 – Cable Management

Cable Preparation
Mid-Entry Practices
Closure Preparation
Panel and FDH Dressing
Splitter Installation
Splice Tray Fiber Routing

Station #2 – Splicing

Strip and Cleave Processes
Inline Splicing
Pigtail Splicing
Adjusting the Fusion Splicer
Troubleshooting Splices
FTTx Splicing Equipment

Station #3 – OTDR Operation

Theory and Operation
OTDR Use in FTTx Installations
FTTx OTDR Signatures
Measuring Reflectance
Testing Splitters

Station #4 – Optical Loss Testing

FTTx Test Equipment
Testing OLT/ONT Power Levels
Test Points in FTTx Installations
Upstream/Downstream Testing
Troubleshooting
Testing Splitters

Fiber Optics for Traffic Systems

Course Objective

To provide a practical understanding of how fiber optics and fiber-optic technology are integrated into modern intelligent transportation systems (ITS).

Course Level

Introductory to intermediate. Beginners to experienced fiber technicians find the class and extensive hands on skills training beneficial.

Fiber Optics for ITS Level I

Two days of classroom training covering fiber optic theory, installation, splicing, system design, testing, and maintenance disciplines. In addition, the course includes four chapters on video transmission, real-time video, traffic control systems, and next generation systems that are key to the evolution from analog to digital ITS applications. The class also includes optical multiplexing (WDM, CWDM), bi-directional transmission, and bandwidth considerations.

Level I Classroom (16 Hours)

Introduction to Fiber Optics

Fiber Theory and Optical Fibers
Fiber Optic Cables
Fiber Optic Connectors
Fiber Optic Splicing
Panels, Trays and Closures
Installation Methods and Tools
Testing and Test Equipment
Maintenance and Restoration
Fiber and Laser Safety
Light Sources
Detectors
Repeaters and Regenerators
Analog and Digital Transmission
Passive Devices

System Standards

System Design

Video Transmission

Transmission Formats
Data Transport Systems

Real-time Video

Multi-channel • High-density
FM and Digital Transmission

Traffic Control Systems

Traffic Controllers
Data Modem Protocols

Next Generation Systems

Legacy • Hybrid • All-IP

Fiber Optics for ITS Level II

Two additional days of in-depth hands-on training on fiber optic splicing, cable preparation, OTDR operation, optical loss testing, and system design.

Level II Hands-on (16 Hours)

Station #1 – Splicing

Fusion and Mechanical
Restoration Scenarios
Fiber Handling and Cleaving
Terminating No-Polish Connectors

Station #2 – Cable Preparation

Loose Tube Cables
Indoor/Outdoor Cables
Patch Panel Preparation
Splice Closure Preparation
Mid-Entry Practices

Station #3 – OTDR Operation

Acceptance Testing
Span Acceptance/Splice Loss
Reflection Testing
Emergency Restoration
Troubleshooting

Station #4 – Optical Loss Testing

Cleaning and Inspection
Link Loss Measurement
Identifiers and Tracers
Documentation

Station #5 – Systems

CCTV Video Systems
Multi-Drop Data Networks
Measure Tx and Rx Power
Variable and Fixed Attenuators

COURSE FEES

- Fiber Optics for ITS Level I \$735
- Fiber Optics for ITS Level II \$830
- Optional IMSA Level I or Level II Certification \$125 each



Attention IMSA Members

The Light Brigade and the International Municipal Signal Association (IMSA) are working closely to offer the Fiber Optics for ITS course at locations around the country. IMSA members have two options for attending this course:

Attend a public offering of the course at one of our previously-scheduled locations. Contact The Light Brigade directly to register.

Host a private offering of the course at the location of your choice and on the dates of your choice. Contact your local IMSA chapter if you are interested in sponsoring a course near you.

IMSA members are eligible for a 15% discount on all Light Brigade training courses.

Certification

IMSA Fiber Optics for ITS Levels I and II



For Level I certification, complete the Fiber Optics for ITS Level I course and pass the Level I certification exam.

For Level II certification, complete the Fiber Optics for ITS Level II course and pass the Level II certification exam. Level I certification is required to be eligible for Level II.

"This class was completely unbelievable. I was totally blown away by the knowledge of [the instructor]. How he remembers all the numbers and data is truly amazing. It's not often that you meet someone so smart, but yet manages to teach a class on a level that we could all understand." – Gail Hannaford, MISSOURI DOT

Fiber Characterization

PMD, CD and ORL

Course Objective

To provide a practical understanding of the principles behind building and maintaining high-speed networks. Theoretical limits and practical field measurement techniques are demonstrated by calculating and measuring key critical parameters such as polarized mode dispersion (PMD), chromatic dispersion (CD) and optical return loss (ORL) for evaluation of network upgrades.

Course Level

Intermediate to advanced. System designers and experienced fiber technicians find the class and extensive hands-on skills training beneficial.



COURSE FEES

- Three-day Course \$1500

Day 1 Classroom (8 Hours)

Introduction

Fiber Theory
Fiber and System Standards

Singlemode Fibers

Transmission Basics
Fiber Composition and Types

Connectors

Connector Polishes
Visual Inspection
Cleaning and Reflectance

Test Equipment

OSP Test Equipment
Dispersion Test Equipment

Installation

System Overview

Active and Passive Devices

Dispersion

Pulse Spreading
Dispersion Penalties
Dispersion Compensation

Chromatic Dispersion

Components / Measurements
Test Methods

Polarization Mode Dispersion

Polarization States
Components / Measurements
Test Methods

Day 2 OTDRs (8 Hours)

CLASSROOM (4 HOURS)

OTDR Theory and Operation

How the OTDR Works
Platform OTDRs
OTDR Settings and Menus
Acceptance Testing
Testing the Outside Plant

OTDR Setup

Pulsewidth / Range
Averaging / Backscatter

Loss Measurement

Splice Loss
Span Optical Return Loss

Measuring Reflectance

Deadzone Boxes / Terminators
Connector Reflectance

Restoration

TRAINING LABS (4 HOURS)

OTDR Testing

Launch Conditions
Bi-directional Testing
Wavelength Testing
Event Analysis
Effective Group Index of Refraction
Backscatter Calibration
Anomalies
Correction Factors

Days 3 CD & PMD (8 Hours)

TRAINING LABS

Cleaning Practices

Visual Inspection

Documentation

Dispersion Testing

Build an 80-km span with G.655 fiber
Build a 50-km span with G.652 fiber
Polarization mode dispersion testing
Chromatic dispersion testing
Optical fiber mismatches
Dispersion compensating modules

"This is the second time I have attended your training and both classes far exceeded my expectations. I have been working in the field for 15 years and I thought I knew everything...to my surprise I learned a lot." – Aram Lewis, PREMIER CABLING SOLUTIONS

2010 Training Schedule

Location	Type	Dates	Location	Type	Dates	Location	Type	Dates
AK Anchorage	F0123	March 23-26, 2010	IA Des Moines	F0123	June 15-18, 2010	PR San Juan	F0123	March 16-19, 2010
Anchorage	F0123	Oct. 26-29, 2010	Cedar Rapids	F0123	Sept. 21-24, 2010	San Juan	F0123	Nov. 30-Dec. 3, 2010
Anchorage	MOD	Jan. 11-15, 2010	ID Boise	F0123	July 27-30, 2010	RI Providence	F0123	Aug. 3-6, 2010
Anchorage	MOD	Nov. 8-12, 2010	Idaho Falls	F0123	Aug. 17-20, 2010	SC Charleston	F0123	Jan. 5-8, 2010
AL Huntsville	F0123	Jan. 26-29, 2010	IL Chicago	F0123	July 13-16, 2010	Columbia	F0123	May 4-7, 2010
Birmingham	F0123	April 13-16, 2010	Springfield	F0123	Aug. 30-Sept. 2, 2010	Spartanburg	F0123	Aug. 24-27, 2010
Mobile	F0123	May 11-14, 2010	Chicago	F0123	Nov. 30-Dec. 3, 2010	Charleston	F0123	Sept. 28-Oct. 1, 2010
Montgomery	F0123	Sept. 21-24, 2010	Chicago	ITS	Oct. 12-15, 2010	Spartanburg	FTTx	April 27-30, 2010
AR Little Rock	F0123	May 24-27, 2010	Chicago	MOD	Aug. 2-6, 2010	Spartanburg	FTTx	Oct. 19-22, 2010
CA Santa Rosa	F0123	Jan. 12-15, 2010	IN Indianapolis	F0123	May 18-21, 2010	Spartanburg	FUND	March 30-31, 2010
Long Beach	F0123	Jan. 19-22, 2010	KS Kansas City	F0123	May 11-14, 2010	Spartanburg	FUND	June 2-3, 2010
Oakland	F0123	Feb. 2-5, 2010	Topeka	F0123	Nov. 16-19, 2010	Spartanburg	FUND	Sept. 8-9, 2010
San Bernardino	F0123	Feb. 9-12, 2010	Kansas City	MOD	June 14-18, 2010	Spartanburg	FUND	Nov. 22-23, 2010
San Diego	F0123	March 16-19, 2010	KY Lexington	F0123	May 24-27, 2010	Spartanburg	FUND	Dec. 20-21, 2010
San Francisco	F0123	Mar. 29-Apr. 1, 2010	Louisville	F0123	Nov. 16-19, 2010	Columbia	MOD	June 7-11, 2010
San Jose	F0123	June 22-25, 2010	LA Shreveport	F0123	Feb. 9-12, 2010	Spartanburg	PMD	July 7-9, 2010
Riverside	F0123	July 13-16, 2010	Baton Rouge	F0123	Oct. 5-8, 2010	SD Sioux Falls	F0123	Oct. 12-15, 2010
Sacramento	F0123	Aug. 3-6, 2010	Baton Rouge	MOD	Nov. 1-5, 2010	TN Memphis	F0123	June 8-11, 2010
Anaheim	F0123	Aug. 24-27, 2010	MA Boston	F0123	March 9-12, 2010	Chattanooga	F0123	July 27-30, 2010
Oakland	F0123	Nov. 9-12, 2010	Boston	F0123	Sept. 14-17, 2010	Nashville	F0123	Dec. 14-17, 2010
San Diego	F0123	Nov. 16-19, 2010	MD Baltimore	F0123	Feb. 23-26, 2010	TX Houston	F0123	Jan. 12-15, 2010
Burbank	F0123	Dec. 7-10, 2010	MI Lansing	F0123	Aug. 17-20, 2010	Dallas	F0123	Feb. 23-26, 2010
Redding	FUND	April 13-14, 2010	MN Minneapolis	F0123	March 2-5, 2010	Amarillo	F0123	Mar. 29-Apr. 1, 2010
San Bruno	ITS	Jan. 26-29, 2010	Duluth	F0123	April 6-9, 2010	El Paso	F0123	April 20-23, 2010
El Monte	ITS	Feb. 2-5, 2010	Minneapolis	F0123	Nov. 8-11, 2010	San Antonio	F0123	May 4-7, 2010
San Bernardino	MOD	March 8-12, 2010	Minneapolis	FTTx	Dec. 6-9, 2010	Austin	F0123	July 20-23, 2010
San Jose	MOD	July 12-16, 2010	Minneapolis	FUND	Jan. 6-7, 2010	Dallas	F0123	Sept. 21-24, 2010
Sacramento	MOD	Oct. 4-8, 2010	MO St. Louis	F0123	April 27-30, 2010	Houston	F0123	Oct. 26-29, 2010
CO Denver	F0123	July 27-30, 2010	Jefferson City	F0123	Nov. 2-5, 2010	Corpus Christi	F0123	Nov. 2-5, 2010
Denver	F0123	Nov. 2-5, 2010	St. Louis	MOD	May 24-28, 2010	Dallas	F0123	Dec. 14-17, 2010
Denver	MOD	Aug. 23-27, 2010	MS Jackson	F0123	Jan. 19-22, 2010	Ft. Worth	FTTx	May 24-27, 2010
CT Hartford	F0123	Feb. 23-26, 2010	MT Helena	F0123	Aug. 23-26, 2010	Dallas	MOD	March 22-26, 2010
DC Washington	F0123	March 9-12, 2010	NC Winston-Salem	F0123	Jan. 26-29, 2010	UT Salt Lake City	F0123	April 6-9, 2010
Washington	F0123	Oct. 26-29, 2010	Charlotte	F0123	March 2-5, 2010	Salt Lake City	F0123	Dec. 14-17, 2010
Washington	ITS	July 27-30, 2010	Raleigh	F0123	June 22-25, 2010	VA Norfolk	F0123	Jan. 12-15, 2010
Washington	MOD	April 26-30, 2010	Charlotte	F0123	Nov. 9-12, 2010	Richmond	F0123	Feb. 2-5, 2010
FL Tampa	F0123	Jan. 5-8, 2010	Raleigh	FUND	July 7-8, 2010	Norfolk	F0123	June 28-July 1, 2010
Orlando	F0123	Feb. 16-19, 2010	Charlotte	MOD	Feb. 8-12, 2010	WA Seattle	F0123	March 9-12, 2010
Miami	F0123	March 16-19, 2010	ND Bismarck	F0123	July 13-16, 2010	Seattle	F0123	June 15-18, 2010
Jacksonville	F0123	June 15-18, 2010	Fargo	F0123	Oct. 5-8, 2010	Seattle	F0123	Sept. 14-17, 2010
Tampa	F0123	Sept. 28-Oct. 1, 2010	NE Omaha	F0123	July 20-23, 2010	Spokane	F0123	Nov. 16-19, 2010
Tallahassee	F0123	Oct. 5-8, 2010	NH Concord	F0123	Aug. 3-6, 2010	Seattle	F0123	Dec. 14-17, 2010
Panama City	F0123	Oct. 19-22, 2010	NM Albuquerque	F0123	April 6-9, 2010	Seattle	FTTx	Feb. 16-19, 2010
Orlando	F0123	Dec. 7-10, 2010	Albuquerque	F0123	Oct. 19-22, 2010	Seattle	FTTx	June 8-11, 2010
Orlando	ITS	April 20-23, 2010	Albuquerque	MOD	Nov. 15-19, 2010	Seattle	FUND	Aug. 10-13, 2010
Orlando	MOD	Feb. 22-26, 2010	NV Reno	F0123	Jan. 19-22, 2010	Seattle	FUND	March 30-31, 2010
Miami	MOD	Oct. 18-22, 2010	Las Vegas	F0123	March 16-19, 2010	Seattle	FUND	June 2-3, 2010
Tampa	MOD	Dec. 13-17, 2010	Las Vegas	F0123	Sept. 28-Oct. 1, 2010	Seattle	FUND	Sept. 8-9, 2010
GA Savannah	F0123	March 23-26, 2010	Las Vegas	MOD	April 12-16, 2010	Seattle	FUND	Nov. 22-23, 2010
Atlanta	F0123	April 13-16, 2010	NY New York	F0123	April 27-30, 2010	Seattle	FUND	Dec. 20-21, 2010
Atlanta	F0123	Aug. 30-Sept. 2, 2010	Buffalo	F0123	May 11-14, 2010	Seattle	ITS	March 2-5, 2010
Atlanta	F0123	Dec. 7-10, 2010	Albany	F0123	Aug. 10-13, 2010	Seattle	ITS	Nov. 9-12, 2010
Atlanta	MOD	May 3-7, 2010	Syracuse	F0123	Sept. 14-17, 2010	Seattle	MOD	Jan. 18-22, 2010
Atlanta	MOD	Sept. 13-17, 2010	New York	F0123	Sept. 28-Oct. 1, 2010	Seattle	MOD	March 15-19, 2010
HI Honolulu	F0123	Feb. 16-19, 2010	New York	FUND	Feb. 17-18, 2010	Seattle	MOD	May 17-21, 2010
Honolulu	F0123	Oct. 12-15, 2010	New York	ITS	Aug. 30-Sept. 2, 2010	Seattle	MOD	July 19-23, 2010
Honolulu	MOD	Jan. 25-29, 2010	OH Toledo	F0123	April 20-23, 2010	Seattle	MOD	Sept. 20-24, 2010
			Columbus	F0123	June 8-11, 2010	Seattle	MOD	Nov. 29-Dec. 3, 2010
			Cincinnati	F0123	Aug. 30-Sept. 2, 2010	Seattle	PMD	Jan. 6-8, 2010
			Columbus	MOD	June 28-July 2, 2010	Seattle	PMD	March 29-31, 2010
			OK Tulsa	F0123	May 18-21, 2010	Seattle	PMD	June 2-4, 2010
			OR Portland	F0123	June 28-July 1, 2010	Seattle	PMD	Sept. 8-10, 2010
			Portland	F0123	Nov. 30-Dec. 3, 2010	Seattle	PMD	Dec. 1-3, 2010
			Portland	FUND	July 7-8, 2010	WI Milwaukee	F0123	April 20-23, 2010
			PA Philadelphia	F0123	Feb. 2-5, 2010	Madison	F0123	Aug. 17-20, 2010
			Philadelphia	F0123	July 20-23, 2010	WY Casper	F0123	May 18-21, 2010
			Pittsburgh	F0123	Aug. 10-13, 2010			
			Philadelphia	ITS	May 11-14, 2010			
			Philadelphia	MOD	Aug. 16-20, 2010			

Training Discounts

- \$50 "Early Bird" Savings — When you pay for your course 60 days in advance.
- 10% for multiple attendees from the same organization.*
- 25% for previous attendees of our four-day courses.*
- GSA discounts are available.*

*These discounts cannot be combined.

Custom Fiber Optic Training

Advantages of a Light Brigade Custom Course

The Light Brigade can develop and deliver a custom course specific to your needs and application. Let us create a course to meet your desired skill level and to focus on specific subject matter. We have produced thousands of customized courses, DVDs, videos, and other training materials.

Convenience: The course can be taught at your site(s) and scheduled to meet your business needs.

Cost and time savings: Eliminate travel time and expense to and from a public class. Also, your employee's time will only be spent on issues critical to your company's business.

Develop expertise: Use your own equipment in our training or have us bring our extensive inventory of supplies and equipment. You decide!

Critical emphasis: You pick the points, products, and techniques of particular importance to your operations, and our skilled instructors and technicians will tailor a custom course to meet your requirements.

Scheduling flexibility: A custom course can be any length: one day, one week, or longer. It can be scheduled during or after normal business hours. There can be sessions spread out throughout the year and delivered at different company locations. You choose what makes sense for your organization.

Subjects We Teach

- Fundamentals
- Fiber to the User (FTTx)
- Fiber Characterization
- Emergency Restoration
- PMD, CD, and ORL
- Premises Testing
- Network Maintenance
- Advanced Fiber Optic Systems
- DWDM
- SONET
- ROADM/Switched Networks
- Long Haul and MANs
- Ethernet

Industries We Train

- Telephone
- Utilities
- Broadband CATV
- Government
- Military
- Aerospace
- Transportation
- Manufacturing
- Industrial
- Oil & Gas
- Mining
- Natural Resources



Fiber Optic Training on CD-ROM

The Light Brigade's CDs are gradually being phased out as our new series of Staff Development DVDs are released. The following CDs are available for those who prefer a lowest cost versus the latest content and flexibility offered by the new series of DVDs.

Video CD-ROMs		Length	Part #
Fiber Optic Installation	This CD covers proper placement of optical communication systems for LANs, WANs and MANs, methods used to correctly install optical cables, and footage of actual installations.	41 min.	W-5LI
Fiber Optic Safety	A practical guide for those working around optical fiber communication systems, this CD explains many safety issues for field and lab applications working with fiber. It has examples of good safety practices and standards.	26 min.	W-5LJ
Plastic Optical Fiber	Plastic Optical Fiber (POF) provides a simple low-cost alternative to glass fiber and is used in thousands of applications. This CD shows how POF works, how it is manufactured and reviews current and future applications.	23 min.	W-5LK
Interactive Computer-based Training (CBT)		Length	Part #
FTTx/PON CBT	Learn about the variations, standards, topologies, components, and business issues related to FTTx/PON, including interactive exercises that allow you to design a PON system based on ITU specifications. Embedded animations, video clips, photos and graphics make this an excellent training and reference tool.	n/a	W-6B-PON

Staff Development DVDs

Our series of menu-selectable Staff Development DVDs feature high-quality video, animations and graphics to enhance the learning experience and allow for visual identification of theoretical concepts and “inside” topics.

Introduction to Fiber Optics **NEW!**

This comprehensive overview of fiber optics contains 14 introductory chapters from other Light Brigade DVDs. Learn, enjoy, and appreciate everything this amazing technology has to offer.

Part #W-6D-101 (First edition)
105 minutes

Fundamentals of Fiber Optics

This primer is key for anyone who works with fiber optics. Learn how fiber optics is applied in today's voice, video and data communication systems. Learn fiber theory, terminology, and how various types of fiber are manufactured.

Part #W-6D-112 (Second edition)
80 minutes

OTDR Theory and Operation

The OTDR is a crucial instrument for acceptance testing and troubleshooting. Learn how to use an OTDR in various testing scenarios including FT Tx, PMD, LAN and OSP applications.

Part #W-6D-121 (First edition)
86 minutes

Fiber Optic Test Equipment and Testing Fiber Optic Links

A wide variety of test equipment—from OTDRs to simple hand-held devices—are used in the acceptance testing and maintenance of fiber optic systems and links. Explore how these instruments are applied in today's networks.

Part #W-6D-131 (First edition)
81 minutes

Troubleshooting A Fiber Optic Link

The key to an effective maintenance program is the proper selection and usage of fiber optic test equipment. Learn to choose the best equipment and techniques for the task at hand, including acceptance testing and restoration.

Part #W-6D-141 (First edition)
90 minutes

Fiber Optic Cable

Outside plant, utility, and premises applications employ many types of fiber optic cable. Learn how these cables are structured, manufactured, prepared for splicing and termination, and deployed.

Part #W-6D-151 (First edition)
106 minutes

Fiber Optic Splicing

In today's fiber optic networks, low loss splicing is the cornerstone of optimal network performance. Learn the correct methods of performing mechanical and fusion splices and gain the skills necessary to produce high quality, low loss splices in any fiber application.

Part #W-6D-161 (First edition)
95 minutes

Fiber Optic Patch Panels, Splice Closures and Pedestals

Cable management products have evolved greatly over the years, and fulfill many roles today. Learn how they are typically employed in today's networks, and how they are integrated with optical cable.

Part #W-6D-171 (First edition)
100 minutes

Fiber Optic Connectors

Proper connectorization is critical to the success of a fiber link, and ultimately lies in the hands of the technician. From polishing to cleaning to visual inspection, a technician must be able to properly terminate each fiber and ensure it provides the lowest loss possible to achieve optimum performance.

Part #W-6D-181 (First edition)
118 minutes



Fiber Optic Active Devices

A fiber optic system cannot function without light sources and detectors. Learn what these devices are, how they function, and how they are tested and integrated into transmission systems.

Part #W-6D-191 (First edition)
121 minutes

Fiber Optic Passive Devices **NEW!**

DWDM, FT Tx and ROADM fiber optic systems incorporate an enormous amount of optical passive devices. Learn about the many types of passive devices and how they are integrated to increase network bandwidth and reliability, while simultaneously lowering costs.

Part #W-6D-201 (First edition)
118 minutes

These DVDs have been filmed by professional cinematographers and provide an unbiased, international perspective. The close-up filming allows small, difficult-to-see components, as well as installation content to be presented in a clear, easy-to-see manner.

The content is formatted for easy presentation either by menu-selectable chapters or in continuous play mode. Each DVD includes a quiz, along with an answer sheet, in Word format.

Make these valuable staff development tools a part of your training library!