

# 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 scheduled public offering of the course at one of the locations listed on the left. 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

# 2010 Training Schedule

Location	Type	Dates	Location	Type	Dates	Location	Type	Dates
<b>AK</b> Anchorage	F0123	March 23-26, 2010	<b>IA</b> Des Moines	F0123	June 15-18, 2010	<b>PR</b> San Juan	F0123	March 2-5, 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	<b>ID</b> Boise	F0123	July 27-30, 2010	<b>RI</b> Providence	F0123	Aug. 3-6, 2010
Anchorage	MOD	Nov. 8-12, 2010	Idaho Falls	F0123	Aug. 17-20, 2010	<b>SC</b> Charleston	F0123	Jan. 5-8, 2010
<b>AL</b> Huntsville	F0123	Jan. 26-29, 2010	<b>IL</b> 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
<b>AR</b> Little Rock	F0123	May 24-27, 2010	Chicago	MOD	Aug. 2-6, 2010	Spartanburg	FTTx	Oct. 19-22, 2010
<b>CA</b> Santa Rosa	F0123	Jan. 12-15, 2010	<b>IN</b> Indianapolis	F0123	May 18-21, 2010	Spartanburg	FUND	March 30-31, 2010
Long Beach	F0123	Jan. 19-22, 2010	<b>KS</b> 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	<b>KY</b> 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	<b>LA</b> 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	<b>SD</b> Sioux Falls	F0123	Oct. 12-15, 2010
Sacramento	F0123	Aug. 3-6, 2010	Baton Rouge	MOD	Nov. 1-5, 2010	<b>TN</b> Memphis	F0123	June 8-11, 2010
Anaheim	F0123	Aug. 24-27, 2010	<b>MA</b> 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	<b>MD</b> Baltimore	F0123	Feb. 23-26, 2010	<b>TX</b> Houston	F0123	Jan. 12-15, 2010
Burbank	F0123	Dec. 7-10, 2010	<b>MI</b> Lansing	F0123	Aug. 17-20, 2010	Dallas	F0123	Feb. 23-26, 2010
Redding	FUND	April 13-14, 2010	<b>MN</b> 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	<b>MO</b> St. Louis	F0123	April 27-30, 2010	Houston	F0123	Oct. 26-29, 2010
<b>CO</b> 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	<b>MS</b> Jackson	F0123	Jan. 19-22, 2010	Ft. Worth	FTTx	May 24-27, 2010
<b>CT</b> Hartford	F0123	Feb. 23-26, 2010	<b>MT</b> Helena	F0123	Aug. 23-26, 2010	Dallas	MOD	March 22-26, 2010
Washington	F0123	March 9-12, 2010	<b>NC</b> Winston-Salem	F0123	Jan. 26-29, 2010	<b>UT</b> 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	<b>VA</b> Norfolk	F0123	Jan. 12-15, 2010
Washington	MOD	April 26-30, 2010	Charlotte	F0123	Nov. 9-12, 2010	Richmond	F0123	Feb. 2-5, 2010
<b>FL</b> 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	<b>WA</b> Seattle	F0123	March 9-12, 2010
Miami	F0123	March 16-19, 2010	<b>ND</b> 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	<b>NE</b> Omaha	F0123	July 20-23, 2010	Spokane	F0123	Nov. 16-19, 2010
Tallahassee	F0123	Oct. 5-8, 2010	<b>NH</b> Concord	F0123	Aug. 3-6, 2010	Seattle	F0123	Dec. 14-17, 2010
Panama City	F0123	Oct. 19-22, 2010	<b>NM</b> 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	FTTx	Aug. 10-13, 2010
Orlando	MOD	Feb. 22-26, 2010	<b>NV</b> 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
<b>GA</b> 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	<b>NY</b> 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
<b>HI</b> 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	<b>OH</b> 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
			<b>OK</b> Tulsa	F0123	May 18-21, 2010	Seattle	PMD	June 2-4, 2010
			<b>OR</b> 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	<b>WI</b> Milwaukee	F0123	April 20-23, 2010
			<b>PA</b> Philadelphia	F0123	Feb. 2-5, 2010	Madison	F0123	Aug. 17-20, 2010
			Philadelphia	F0123	July 20-23, 2010	<b>WY</b> 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

- 10% "Early Bird" Sign-up — Register and pay for a course at least 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.
- Discounts cannot be combined.