

This three-day class has been developed with 16 hours of classroom lecture and 8 hours of hands-on design exercises to teach attendees to apply critical issues such as take rate and density to outside plant design. This course covers FTTH network field configurations, design benchmarks, and installation parameters for active Ethernet and PON systems. Attendees will create their own FTTx network designs in classroom break-out sessions, applying the learned objectives to distributed split, centralized split, home run, and point-to-point systems.

Prerequisites: This class requires knowledge of fiber optic theory and terminology, as well as field experience, or equivalent formal training such as the Certified Fiber to the Home Professional (classroom or online) course.

Certifications and Credits: Fiber Broadband Association FTTx OSP Design
Light Brigade Certificate of Completion

Introduction to FTTx

- Fiber optic transmission
- Basic fiber optic terminology
- The three big issues
- Lightwave transmission
- FTTH formats
- POLAN
- PON generations

Optical Fiber

- Fiber specifications
- Single-mode fiber characteristics
- Single-mode fiber types

Optical Cables

- Cable designs
- Optical cable for FTTx
- High fiber count cables
- Aerial fiber optic cables
- Distribution cables
- Cable structure and fiber counts
- Fiber and buffer color codes
- Cable handling
- Outside plant cable management

Connectors and Splitters

- Common FTTx connectors
- Small form factor LC connectors
- Multifiber connectors
- Hardened connectors
- Field terminated FTTH connectors
- Splice-on connectors
- Fiber optic connector polishes
- Splitter flexibility and management

AE versus PON

- FTTH design options
- AE versus PON cost comparisons
- The fundamental fiber plan

Fundamental Fiber Planning

- Fundamental planning design steps
- Cost considerations and variances
- Fiber and cable management
- Central office location strategy
- Ideal placements and configurations
- Density and central office location
- PON systems design
- Typical outside plant fundamental planning



Futureproofing

- Fiber cable sizing
- Full spectrum zero water peak fiber
- FTTx needs stable reliable performance

PON Design Options

- Distributed split designs
- Determining the best solution
- OLT and splitter relationship
- Pseudo cabinet concept
- Fiber cable tapering
- FTTx design efficiency
- Operational issues

Fiber to the Building

- MDUs and MTUs
- Get cabling to each user
- Fiber in the building design goals
- MDU existing infrastructure
- Telecommunications room
- MDU cabling systems
- Typical design strategies
- Splitter design for MDUs
- End user locations
- Optical network terminals and access points
- Bend-insensitive fiber for FTTB

Single-family Residential Areas

- PON areas
- Subdivision design strategies
- Typical drop layout
- Fiber drop design

Connectorization Options

- Termination options
- Connectorized versus fusion splicing
- Conventional versus plug-and-play
- Capital expenditures (CAPEX)
- Network performance
- Organizational considerations
- Developing a cost model
- Take rates

Rural Areas

- Network design for rural areas
- Ideal hub/node placement
- Splitter placement and distribution
- Conceptual example of reusing dead fibers

WDM-PON

- ODN and OSP issues
- WDM-PON
- NG-PON and NG-PON2
- TWDM-PON
- Point-to-point WDM
- Wavelength allocations
- Fiber implications
- Spectral flexibility
- Multiplexing and demultiplexing
- Network design conversion

Design Steps

- PON loss budgets
- Calculating network loss
- General design steps
- Home run design steps
- Cabinet design steps
- Distributed design steps

Specifications

- Product specifications
- Partial fiber specifications
- Typical optical cable specification sheet

Miscellaneous

- ITU-T standards
- Splitter specifications
- WDM specifications
- Telcordia requirements
- Physical layer standards
- Outside plant standards
- North American Codes
- Proper aerial route planning and engineering
- Fiber quality