



Class title: Fiber to the User (Fiber 102)

Class hours: 9:00 a.m. to 4:00 p.m., with a one-hour lunch - food not provided.

Class dates: October 1, 2009

Course objective: This course covers the products, disciplines and standards involved with fiber to the home, business or multi-dwelling sites. This technical primer is ideal for those planning, designing, installing or maintaining an FTTx network and will review FTTH technologies from components to systems

Course description: Fiber to the user (FTTx) installations are exploding as the bandwidth requirements of our communications society continues to grow. With new funding available through the ARRA and RUS only FTTx can provide the bandwidth for providing triple play (voice, video and data) services to end-users today and to meet the requirements of future communications. FTTx is ideal for providing high bandwidth services to the home (FTTH), building or businesses (FTTB).

The course is structured in an easy to absorb, easy to follow "building block" format that allows the novice or expert to understand the many FTTx design and installation options including optical theory, standards, components, variations, systems, and associated maintenance disciplines.

The course is non-vendor specific.

Additional materials: PowerPoint presentation will highlight key points of the training material using graphics, photographs, animations, and examples that are designed to stimulate interest and explain concepts.

Production quality video clips and animations are used throughout the course to bring the students into the "field" to show practical usage and offer clear explanations of the more technical aspects.

See backside for a detailed course outline.

Course Outline — Day One (Classroom Lecture)

- **Course basics**
 - Advantages and disadvantages
 - Standards
 - Symbols
 - Theory
 - Attenuation
 - Dispersion
- **Optical fiber**
 - Singlemode G.652
 - Singlemode G.652D
 - Singlemode G.655
 - Singlemode G.657
 - Ribbon fiber issues
- **Optical cable**
 - Loose tube
 - Feeder
 - Distribution
 - Drop
 - Tight buffered
 - Premises
 - BIF cables
- **Splicing**
 - Fusion splicing
 - Ribbon splicing
 - Pigtail splicing
 - Locations
- **Connectors**
 - SC and LC
 - Polishes and reflection
 - Inspection and testing
 - Pre-terminated drop cables
 - Hardened connectors
 - Cleaning
 - Attenuators and terminators
- **Panels, pedestals and closures**
 - Patch and splice panel
 - Entrance facilities
 - Fiber distribution hubs
 - Fiber access terminals
 - Multi service terminals
- **Splice closures**
 - Types
 - Cable issues
 - Splitter issues
- **Installation**
 - Cable types
 - Standards and codes
 - Cable pulling
 - Direct burial
 - Duct
 - Aerial
 - Slack storage issues
 - Premises
 - Drop cable/termination options
- **Testing**
 - Troubleshooting tips
 - Test reports
 - Documentation
 - Testing challenges
 - Test points
 - OTDRs
 - Optical loss test equipment
 - Visual tracers
- **Restoration and maintenance**
 - Typical causes of failure
 - Planning
 - Flow chart
- **Fiber optic safety**
 - Laser safety
 - Optical fibers
 - Chemicals and MSDS
- **Design and system elements**
 - Wavelength division multiplexing
 - Splitters
 - Topologies (urban, rural and multiple dwelling units)
 - Transmitters/receivers
 - OLTs and ONTs
 - Protocols
 - BPON
 - EPON
 - GPON
 - Active Ethernet
 - WDM PON
 - Battery back-up
 - Standards/specification
- **Equipment on display**