Hands-On

Fiber Optic Designer

Course Description

Fiber optic systems are a key part of new communications services. Teir success depends upon good design. This Hands-On course will cover the particulars of how fiber optic networks are designed within the context of complete communications systems or construction projects. It will and provide an in depth knowledge of processes in delivering new services and selecting the most appropriate plant for successful fiber optic system.

The focus is geared on the design. This includes network protocols, network configurations, optical cabling, industry communications standards, and determination of fiber count, hardware selection, splicing /termination methods, cable system testing, troubleshooting and proper documentation.

This Fiber Optics Designer course provides detailed instruction and Hands-On labs of fiber optic design throughout the course.

Certification(s)
ETA (FOD) Fiber Optic Designer or FOA (CFOS/D) Certification can be administered during this course, upon request.

Students Will Learn

- Produce a design specification for a Fiber Optic Network Service
- Select the correct kind of Fiber links to match application requirements
- Specify the Physical Plant Layout
- Identify the Network Protocols and Network Configurations to be used
- Implement services using Industry Communications Standards
- Determine Fiber, Splicing, Termination, Testing and Troubleshooting procedures
- Calculate Link Loss, throughput and availability of the finished service

- Deliver Documentation matching Industry Standards
- And More...

Prerequisites

A basic understanding of telecommunications and hands-on experience with Fiber Optic systems is assumed.

This information can be obtained in our courses below or equivalent knowledge
-TeleCom Networks Today
-Basic Telephony & Telecom Electronics

Course Outline

Module I: Fiber Optic Applications: Design Process

Appreciating What Fiber Optics Can Do

Identifying the User Requirements

Documenting and Agreeing the User Specification

Translating into Technical Requirements

Specifying Key Network Parameters

Producing a Link Specification

Proving the Design Meets the Specification

Installing, Testing and Troubleshooting Procedures

Delivering Documentation of the Service

Module II: The Requirements Specification

Analyzing the User Requirements

Bit rate and bandwidth

Error ratio and availability

Locating where the service is required

Predicting the future needs

Documenting the Specification

Module III: Key Applications of Fiber Optic Systems

Data Center Design Anatomy: Functional Areas, Layered Protocols

Ethernet LAN Solutions

Optical Carrier Ethernet

Ethernet Speed Options and Topology

Fiber Distribution Data Interface (FDDI)

FDDI Functionality

Optical Cabling for FDDI

Fiber Channel: Architectures and Standards

Asynchronous Transfer Mode (ATM)

Telecommunications MPLS Core Networks

Triple Play Services: Voice, TV and High Speed Internet

Access Services

Passive Optical Access Loops

Security and Conference Applications

Digital Cable and DOCSIS 3.0

Designing a Full Service Network

Customer Requirements

Module IV: Translating Requirements into Technical Specifications

Operational System Parameters

Fiber Optics Design Principles

Optical Sources: LED, Vertical Surface Emitting Lasers (VCSELs),Lasers

Modulation

Fiber Types: Multimode, Restricted Mode Launch Bandwidth, Laser Optimized Multimode, Single-mode

Deploying Wavelength Division multiplexing and Switching options

Hardware Selection Factors

Connectors and Splicing Options

Core Network Solutions

Intermediate and Metro Network Cross Connect

Access Solutions: PON, FTTB, FTTC, FTTH

Horizontal Cross Connect and Telecommunications Rooms

Module V: Calculating Key Design Parameters

Theory And Principles of Fiber Optics Link Budgets

Cable Construction

Recommended Cable Types

Cable Selection

Termination Methods

Fusion Splicing Methods

Mechanical Splicing

Loss Analysis Link Loss Calculation

Cost Comparison Model

System Redundancy and Availability

Module VI: . Selecting the Right Technology Solutions

Availability and reliability

Physical and Logical Network Topologies

Point to Point, Ring, Star, Mesh

Physical Plant Layout: Fiber Counts/Types

Structured Cabling

Inter-building, Intra-building and Horizontal Cabling

Distributed vs. Centralized Cabling

Rack Layout, Raceway and Ladder Rack Systems

Fiber Management

Cable Support System Design

Module VII: Testing Procedures for Installation and Design Validation

Optical Testing and Measurements

Reasons for Testing

Types of Test Measurements

Testing Guidelines

Error Ratios

Spectrum testing

Specifying Test & Troubleshooting Procedures

Module VIII: TIA/EIA Standards and Documentation

Commercial Building Telecommunications Cabling Standard (TIA/EIA-568-B)

Administration Standard for the Telecommunications Infrastructure (TIA/EIA-606)

Cable Labelling and Documentation

Building Environments

Cable Ratings

National Electrical Code

Module IX: Conformance and Delivery

Verifying the Design

Validating the Service

Proving the Delivered Network matches the Specification

Evaluation and Review

Delivery Method

Instructor-Led with numerous case-studies and exercises.

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

3 Days