BOOST
THE LEADING TRAINING PROVIDER

Instrumentation & Controls

Fiber Optic Networks Design

Course Introduction

This course covers step by step the fiber optic networks design and architectures, teach the trainees how to design the networks with standards compliant, choose the correct components, manage the installation, set up test plan and study deeply the applications of fiber optic in many applications using the latest technologies

Target Audience

- Designers
- Network
- Telecom engineers
- Presales
- Project managers
- Contractors
- Consultants

Learning Objectives

- Knowledge of fiber optic fundamentals
- Knowledge of network topologies and how to choose the optimized for any application
- Understanding the International standards TIA & ISO
- Study the fiber optic specifications
- Study the deeply the specifications of the fiber optic cables
- Choose the proper and cost effective components
- Choosing the active components
- Preparing Fiber Optic Plant Documentations
- Preparing Plant Link Loss Budget Analysis and Calculation
- Determine the bandwidth and bit rate

- Study the most advanced installation techniques
- Study the huge traffic transmission systems
- Study true examples and studying cases in many sectors
- Study the fiber to the home design and applications

Course Outline

- **01 Day One**

1. Fiber Optic Fundamentals

- Overview
- Advantages of Fiber Optic
- Fiber Optic vs. Copper
- Parameters explaining
- Fiber Optic Transmission Basics

2. Fiber Optic Types & Standards

- Single Mode
- Multi-Mode
- Plastic Fiber Optic

3. Fiber Optic Losses and Transmission Effects

- Insertion and Reflection Loss
- Splice Loss and Termination Loss
- dB & dBm
- Bending, Temperature, Humidity and Pressure

4. Fiber Optic Design Overview

- Introduction to the fiber optic design
- Who can design the fiber optic networks?

- Design Process

- **02 Day Two**

5- Fiber Optic Networks Topologies, Examples and Applications

- Meaning of Topology
- Star Topology
- Ring Topology
- Bus Topology
- Mesh Topology
- Tree Topology

6- Fiber Optic International Standard

- TIA
- ISO

7- Fiber Optic Cable Specifications Studying

- Environmental Specifications
- Mechanical Specifications
- Optical Specifications

8- How to Choose the Components?

- Choosing Fiber Types
- Indoor cables (riser & Plenum)
- Outdoor cable (Armored & Heavy Duty)
- Hardware and Accessories
- Choosing Installation Techniques
- Choosing Civil Materials, Manholes and Conduits
- NEC and IEC standards

- **03 Day Three**

9- Advanced Fiber Optic Cable Installation Techniques

- Cable blowing (air jetting)
- Cable Floating
- Modern Submarine Cabling
- HDD
- Micro Trenching
- Micro Ducting
- Mid-Span

10- Plant Link Loss Budget Analysis and Calculation

- Loss Types
- Total Loss Equation
- Loss Safe Factor

11- Transmission Equipments Power Budget Calculation

- Transmitter Power
- Receiver Sensitivity
- Power Budget Calculation

12-Fiber Optic Active Components

- Fiber / Ethernet converters
- Fiber / Coaxial converters
- Fiber / serial converters
- SM / MM converters
- Industrial Switches
- Cisco SFP selection guide

• **04 Day Four**

13- MM Fiber Bite Rate Calculation

- MM OM1, OM2, OM3 and OM4 Bandwidth
- MM Fiber and Bite Rate Calculation

14- Introduction to Optical Multiplexing

- Introduction to multiplexing
- FDM and TDM
- WDM
- CWDM
- DWDM
- OADM

15- Fiber Optic Project

- Site Survey
- Right of the Way
- Project Costing
- Network Planning
- Network Installation
- Dark Fiber

16- Fiber Optic Plant Documentations

- Network Drawing
- Preparing Bill of Quantities
- Installation Time Schedule
- Testing Sheets format
- Labeling
- As built and Plant Handover

• **05 Day Five**

17-General Fiber Optic Applications and Studying Cases

- Power Application- SCADA system
- Oil Application - Oil pipeline
- Telecom Application - DWDM
- Military Application - Radar
- IT Application - 10G WAN
- Security Application - CCTV
- Media Application - SAN

18-FTTX (Fiber To The X)

- What is the FTTX?
- FTTX vs. Traditional Systems
- FTTO, FTTB, FTTN & FTTH
- Fiber Splitters
- Splitter Loss
- FTTH Design Guide

19-Network Management

- Project management
- Operation support
- Network Analytics
- Managing troubleshooting

20- Review and Quiz

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 11, 2025	May 15, 2025	5 days	4250.00 $	KSA - Riyadh
Sept. 15, 2025	Sept. 19, 2025	5 days	4250.00 $	UAE - Abu Dhabi
Nov. 3, 2025	Nov. 7, 2025	5 days	5950.00 $	USA - Los Angeles
Feb. 24, 2025	Feb. 28, 2025	5 days	4250.00 $	UAE - Dubai