



Fiber Optics Experts

Eagle Photonics

*A Course on
Fundamentals of Fiber Optics, SDH, DWDM & FTTX with hands-on*

Description

A concise overview of Fundamentals of Fiber Optics, FO networks, PDH/SDH, DWDM & FTTX Technologies.

Who will benefit?

Anyone working in the field of telecom, datacom, broadband, Cable TV, automation based on Fiber optics, Optical Communication/Networking, Telecom Software.

Prerequisites

Some background in science / Basic Telecommunication concepts is desirable.

Objectives

By the end of the course Delegates will be :

- Understand basic Fiber Optics Concepts.
- Well versed with applications of Fiber Optics.
- Design & handle simple Fiber Optic Network.
- Operate Splicing Machine, OTDR & similar equipment required for field maintenance.
- Recognize SDH equipments & understand SDH/SONET & DWDM protocols fairly
- Understand upcoming FTTX Technology and can identify various elements involved in that.
- Design complicated network with further self study

Training Schedule

Date : 21st Aug- 25th Aug 2012

Time : 9.30 To 18.00 Hrs.

Total duration : 40 hours

Venue:

The World Trade Center
Dr. Rajkumar Road
Malleshwaram West
Bangalore-560 044

Fees Details:

For Indian Participants: Rs. 20,000

For non Indian Nationals :
US\$ 500

Early bird offer – 5% discount for enrolment and payment of full fees amount by 4th Aug.

Group Discount - For 3 or more participants - 10% discount. Enrolment should be done at the same time with full payment of fees for availing the discount

Course Materials:

One set of presentation materials in hard copy will be provided.

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Training Contents

Session 1

- Introduction & Fundamentals of Telecommunication
- Introduction to Fiber Optics
- Why Fiber Optic Communication?
- Concept of Modes.
- Types of Fibers-SMF, MMF
- Different types of Losses-Radiation, Scattering,
- Macro and Micro bending Loss
- Concept of Dispersion-Modal, Material, Wave-guide, Dispersion, PMD, Positive & Negative dispersion
- Types of Single mode fibers, ITU-T specs G652 B & D, G653, G654, G655, G657 etc.

What is difference between SMF, MMF, NZDF, G-652, G-655 etc?

Why light of 1310 nm & 1550 nm wavelength used for communication?

What are corrugated and non-corrugated, OPGW and Arial cables?

How and why optical fiber for transmission line?

Session 2

- Optical Fiber Cables
 - Outdoor - Duct, Direct buried, Overhead
 - Indoor – Simplex/duplex, breakout, distribution
 - Indoor/outdoor – Micro, blown, drop
 - ADSS, OPGW, Figure 8, Corrugated, Ribbon etc
- Designs and materials for Cables
- Cable installation & laying methods and techniques
- Different Techniques for Joining fibers
- Splicing – Mechanical & Fusion.

Feel yourself the difference in the training provided by Eagle Photonics for Fiber Optics

Session 3

- FO Connectors
 - Types – FC, SC, ST, LC, MU, E-2000 etc.
 - Patch cords, Pigtails, Ferrules, Adapters, sleeves
 - Connector termination techniques – Hand, machine, ready to terminate pre-polished
 - PC, SPC, UPC, APC
 - Insertion and return loss, factors affecting them
- Elements of Fiber Optic Link
 - Splice Joint Closure – Vertical (Dome), Horizontal
 - Fiber termination Boxes – Rack and wall mounts
 - Fiber Management Systems – Fixed, Push-pull
 - Splitter & passive management boxes and modules
 - Cassettes, patch panels, cable management
 - Accessories for different types of cables

What roles connectors play and why so many types of them?

Why Cleanness and proper handling is important in FO connections?

Do you know how the accessories like patch cords, DDF, FDF, attenuators etc are being used actually in networks?

What is the role of an OTDR ?

Session 4

- Test & Measurement of FO networks
 - Loss-dB/dBm, Splice & Link loss
 - Fundamentals of OTDR
 - Fiber events, dead zone, DR, Launch cable
 - Power meter and Light source test
 - VoA, VFL, Fiber Identifier and Inspection scopes
 - Link loss budget
- Passive FO Components
 - Coupler & Splitter
 - Circulator, Isolator
 - Fiber Gratings, Filters
 - Attenuators – fixed, variable, instruments

Why optical passive components are useful?

Understand yourself the delicacy of handling the optical fiber in the field.

Session 5

- Demo & Hands-on
 - Splicing Machine
 - OTDR, Power meter, laser source
 - VoA, VFL, Inspection Scopes
- Demo of different elements of Fiber Optic link.

Learn how to use OTDR and Splicing machine

Understand how a FO link can be tested using Light source and power meter

Session 6

- Multiplexing, PDH and SDH
 - Laser & Detectors
 - Multiplexing techniques- TDM & FDM
 - Primary & Higher order multiplexing
- Optical Transmission link
 - MUXs
 - OLTEs
 - SDH & PDH
 - Concept of Hierarchy

Why PDH is replaced by SDH?

How SDH Testing is Done?

<ul style="list-style-type: none"> ➤ Understand Optical Transmission ➤ Layered Structure ➤ PDH <ul style="list-style-type: none"> ○ Muxes- 34Mbps/ 140Mbps ○ Limitations of PDH ➤ Synchronous and Asynchronous systems ➤ Requirement of synchronous systems ➤ SDH system <ul style="list-style-type: none"> ○ STM-1, STM-4, STM-16, STM-64 ○ Configuration of SDH equipment (TM, ADM & REG) ○ Functions of TM, ADM & REG ○ Pros and Cons of TM over ADM (P2P, Linear, Ring) ○ SDH multiplexing structure (STM-1 frame structure) ○ Function of SDH Overhead bytes ○ Protection Schemes (Unit, Path & Ring) ○ Alarms & Synchronization ○ Testing 	<p>Apart from the theory, participants will get chance to do hands-on SDH equipment (STM-1/STM-4), SDH analyzers, Digital Transmission analyzer, Splicing machine, OTDR, Laser & Power meter, Optical Spectrum Analyzer etc.</p>
<p>Session 7</p> <ul style="list-style-type: none"> ➤ Concept of DWDM & its Fundamentals <ul style="list-style-type: none"> ○ WDM, CWDM, DWDM ➤ ITU-T Grid, C&L bands ➤ Systems for DWDM Networks. ➤ Elements of WDM Link, <ul style="list-style-type: none"> ○ Regenerator, Optical Amplifiers, ○ Optical Add-Drop Mux, Optical cross Connect ➤ Components for DWDM <ul style="list-style-type: none"> ○ Transceiver, XFP, SFP, Xenpack, ○ Tunable Lasers, Multi Frequency Lasers, ○ Transponders, Tunable XFP ➤ DWDM Test & Measurement ➤ DWDM Network Design ➤ Advances in DWDM Networking 	<p>How DWDM Works?</p> <p>What are Transceivers and how tunable transceivers help DWDM network cost reduction?</p> <p>Compare direct Optical amplification with legacy electrical amplification technology</p>
<p>Session 8</p> <ul style="list-style-type: none"> ➤ Hands-on STM-1 & 4 link <ul style="list-style-type: none"> ○ On NMS, NES using Ring & Linear Network ○ On SDH Tester ○ Alarm Testing & Performance Testing. ➤ Hands-on WDM demo link <ul style="list-style-type: none"> ○ Using Light Runner demo of WDM ○ Demo of Optical Amplification ○ Demo of WDM tester like Optical Spectrum Analyzer 	<p>Eagle Photonics has a live model set-up of STM 1 & 4 link to perform hands-on work. Also an innovative training kit, Light Runner” is available to perform WDM & EDFA hands on</p>

<p>Session 9</p> <ul style="list-style-type: none"> ➤ Access network Technologies- <ul style="list-style-type: none"> ○ Basics of PON ○ Active optical Network (AON) ○ Advantages of PON Cost/Service ➤ Fiber in the last Mile <ul style="list-style-type: none"> ○ FTTC/FTTK/FTTB/FTTH ➤ Standards & Protocols for Access Network- <ul style="list-style-type: none"> ○ IEEE 803.3ah/ITU-T G.894.2 ○ APON, BPON, EPON, GEAPON, GPON ○ Comparison and Advantages of each System. ➤ PON Services- <ul style="list-style-type: none"> ○ VOIP & TDM based Voice Services ○ Data Services ○ VLANS & Video Services ➤ Various Elements of Fiber Access Networks- <ul style="list-style-type: none"> ○ OLT, ONU, ODN ○ Cat 5E/ 6/ 6A cables, RJ 45 and RJ11 connectors ○ RF connectivity for Cable TV 	<p>How Fiber has become a household name recently?</p> <p>How fiber is helping Convergence to happen in reality?</p> <p>Compare legacy copper networks to fiber optic networks for more bandwidth requirement</p> <p>What is laser optimized Multi Mode</p> <p>Eagle Photonics is the only company offering quality training on Fiber Optics technology. Delivered training to various corporate and individual in India and abroad.</p>
<p>Session 10</p> <ul style="list-style-type: none"> ➤ Data Networking <ul style="list-style-type: none"> ○ Conventional Copper & Coaxial data networks ○ LAN, WAN, MAN ○ Ethernet Standards ➤ Data networking using Fiber Optics <ul style="list-style-type: none"> ○ Why Fiber Optics in Data Networking ○ Cabling standards ○ Gigabit Ethernet ○ OM1, OM2, OM3 & OM4 fibers, OS1 fiber ○ Fiber Channel ➤ Active & Passive elements <ul style="list-style-type: none"> ○ Racks and LIU ○ Switches and Media converters ➤ Trends in data networking with FO 	<p>For further information and enrolment pl contact:</p> <p>Gitanjali +919341263396 (gitanjali@eaglephotonics.com)</p> <p>Megha +919739798728 (megha@eaglephotonics.com) Phone: +91-80-41673517, 23113241, 23113242 info@eaglephotonics.com</p>