DWDM and Optical Networking

Optical fiber communications applications have extended from single wavelength per fiber technology to multiple wavelength technology known as wavelength division multiplexing (WDM). As the number of wavelength per fiber is equal or greater than 8, the technology is then referred to as dense wavelength division multiplexing (DWDM), greater than or equal to 40 is very dense wavelength division multiplexing (VDWDM), greater than or equal to 200 is very high density wavelength division multiplexing (VHDWDM) and great than 1000 is possible with today's lab technology and goes by different names.

The course starts with the discussion of DWDM concept and vision. It then discusses the key enabling technologies required for implementing DWDM (e.g., stable transmitter, suitable fibers, erbium-doped optical amplifiers, optical filters and wavelength converter). The DWDM optical network architecture (static and reconfigurable networks) and network applications are included in the discussion. Optical layer management (configuration, performance and fault management) is briefly described.

Audience:

It is important for managers, sales forces and technical persons in the telecommunications field to become familiar with the DWDM and optical networking. This course is basically designed for technical persons. However, it can be easily modified and tailored for managers and sales and marketing persons.

Prerequisites:

There are no prerequisites for this course.

Objectives:

At the conclusion of this course the student will be able to describe:

- The vision and concept of DWDM
- The DWDM enabling technologies
- The stable transmitters for DWDM networks
- The optical amplifiers and optical filters
- The DWDM optical network architecture
- DWDM network applications
- DWDM optical layer management

Course Level
Intermediate

DWDM and Optical Networking

Course Outline

Day 1

1. Intro: Transport Network Evolution
- Core transport networks
- Purpose and functions of transport networks
- Transport network evolution

2. Concept and Vision of DWDM
- Why DWDM?
- Benefits of DWDM

3. DWDM and Optical Networking
- Why optical networking?
- Engineering issues of optical networking
- Optical transparency
- Status and issues of DWDM optical networking
- Merits of the DWDM Network

4. DWDM Bands
- C-(conventional or central) band
- S-(short wavelength) band
- L-(long wavelength) band
- DWDM band spacing issues

5. Stable Transmitters
- Key requirements
- Compliant wavelengths (ITU-T grid)
- Wavelength stabilization

6. Fibers for DWDM
- Key requirements
- Various fibers
- Fiber dispersion
- Effect of nonlinearity
- Dispersion management

Day 2

7. Erbium-Doped Optical Amplifiers (EDFAs)
- Key requirements
- C- and L-bands EDFAs
- EDFA gain and transient control

8. Optical Filters, Wavelength Switches and Wavelength Converters

9. DWDM Optical Network Architecture
- Key considerations
- Network topology evolution
- Optical layers
- Static networks
- Reconfigurable networks
- Wavelength assignments

10. DWDM Network Applications
- Optical network customers
- Optical network markets
- Core network applications
- Metro and access applications
- Promising applications on optical network systems
- Optical networking vendors

11. DWDM optical layer management
- Optical layer management considerations
- Configuration management
- Performance management
- Fault management

Applied Learning Solutions
(785) 478-1995
mclark@e-als.com