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Fiber Optic DWDM Training Advanced

30 December 2024 - 3 J 025

Singapore

Fiber Optic DWDM Training Advanced

course code: B9464 From: 30 December 2024 - 3 January 2025 Venue: Singapore - course Fees: 5500 Euro

This course is designed to provide a general overview for strategic or technical managers, consultants, communications professionals, software engineers, system engineers, network professionals, marketing and sales professional, IT professionals, and others who plan on using, evaluating, designing or working with SONET/SDH, D/WDM and optical networks.

Objectives:

After completing this course, students will be able to:

- Understand the basics of optical communications
- Understand the basics of DWDM
- Explain basic DWDM Network Designs and Engineering
- Identify various optical communication principles as well as communication methodologies in an optical fiber
- Learn how to analyze optical links based on power budget
- Classify and design DWDM networks based on size and performance
- Understand and basic design nodal architectures for different classification of DWDM networks
- Learn how to utilize different parameters in DWDM networks and optical systems

Outline:

Introduction to Optical Networking

- Fiber Optics
- Fiber Losses
- Dispersion in Fiber
- Nonlinearities
- Window of Operations
- Fiber Types
- Optical amplifiers
- Light sources and transmitters
- Photodiodes and receivers
- Optical communication systems
- The Physics of Optical components
- Light-Matter and Light-Matter-Light

Common Single Mode Fiber Types:

- Standard Single Mode Fiber
- Dispersion Shifted Fiber (DSF)
- Dispersion-compensating fiber (DCF)
- Non-Zero Dispersion Shifted Fiber (NZ-DSF
- Positive Dispersion SMF
- Dispersion Compensation Unit (DCU)

Introduction to DWDM:

- Optical Networking and DWDM
- Optical Network Breakthroughs
- Special Fibers
- S, C and L Bands
- Optical Components
- Optical Spectral Filters and Gratings
- Optical Demultiplexers
- The Erbium-Doped Fiber Amplifier (EDFA)
- The Tunable Laser Diode Operating at 1550 nm
- In-Fiber Bragg Grating
- Light Sources
- Optical Cross-Connects
- Optical Add-Drop Multiplexers
- DWDM and SONET

DWDM Components and Architecture:

- DWDM Anatomy
- DWDM Impairments
- Multiwavelength Transmitters
- Multichannel Receivers
- DWDM Optical Amplifiers
- Wavelength Converters
- Modal Effects
- Scattering Effects
- Miscellaneous Effects

DWDM Impairments:

- Spectrum
- Availability, Occupancy, Efficiency
- Bandwidth & Distance Limitations
- Noise, Dispersion, Non-linearities

Wavelength Adaptation:

- Wavelength Adapter (or transponder)
- Wavelength Converter
- Precision Wavelength Transmitters (ITU wavelength)

Basic DWDM Optical Components and Elements:

- Optical Filters
- Optical Couplers
- Optical Power Attenuators
- Polarizer and Rotators
- Optical Isolators and Circulators
- Optical Multiplexers and Demultiplexers
- Optical Cross Connects (OCXs)
- Optical Add Drop Multiplexers
- Optical Equalizers
- Light Sources
- Laser Beams
- Modulators
- Photodetectors and Receivers
- Optical Amplifiers
- Wavelength Convertors
- Optical Phase-Locked Loops
- Ring Resonators
- Optical Attenuators
- Optical SNR

DWDM Mux and Demux:

- Channel spacing of 100GHz and 50GHz
- DWDM Demux
- Mux / Demux Technology
- Thin film filters
- Fiber Bragg gratings
- Diffraction gratings
- Arrayed waveguide gratings
- Fused biconic tapered devices
- Inter-leaver devices

Common Amplifier Types:

- A Typical Optical Amplifier
- Doped Fiber Amplifiers
- Erbium Doped Fiber Amplifiers (EDFA)
- Raman Fiber Amplifiers
- Semiconductor Optical Amplifiers (SOA)

Networking with DWDM:

- Optical Systems and Components Analysis
- Optical Transmitters: Lasers
- Modulation: Direct and External
- Optical Receivers: Photodetecters
- Couplers and Circulators
- Cavities and Filter
- Complex Components: Transponders
- Optical Switches
- Mechanical Switches
- Acousto-Optical Switches
- Micro-mechanical switches (MEMS)
- Electro-Optical and Thermo-Optical Switches
- Bubble Technology
- Liquid Crystal Switches
- Hologram-based Switches
- Factors That Affect System Design
- Effect of Chromatic Dispersion

DWDM Span Engineering:

- Engineering a DWDM link
- Power Budget Design
- What are the factors?
- Digital Modulation Formats
- Fiber Impairments
- Loss
- Dispersion
- Nonlinear Effects (SPM, XPM, FWM, Raman)
- Polarization Dependent Effects (PDL and PMD)

DWDM Testing, Measurements and OAM&P:

- Component conformance tests
- Parameter tests on optical fibers
- System installation tests
- System optimization tests
- System acceptance tests