Advanced DWDM Network Design and Operations Training Course

28 March – 1 April 2027
Manama

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Training Center

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Ref: 1715_228901 **Date:** 28 March – 1 April 2027 **Location:** Manama **Fees:** 4700 Euro

Overview

Advanced DWDM Network Design and Operations Training Course is a one-week course for optical network engineers, transmission specialists, network architects, and technical managers, who leave with a DWDM Engineering and Commissioning Pack. Participants connect DWDM network design, optical link budget calculation, OSNR analysis, ROADM architecture, coherent optical transport, commissioning evidence, and fault isolation across metro and long-haul systems. The course turns separate component settings into an engineered and testable optical path. Agile Leaders Training Center presents advanced DWDM network design and operations.

Who Should Attend

- Functions responsible for optical transport architecture and wavelength planning
- Teams responsible for transmission engineering and capacity expansion
- Functions responsible for DWDM commissioning and acceptance testing
- Teams responsible for optical monitoring and fault isolation
- Functions responsible for resilient metro and long-haul network operations

The course assumes participants already work with fiber-optic transmission systems and leaves out basic fiber installation, splicing practice, and vendor certification.

Departments and Industries

The course supports departments and industries that design, operate, or depend on high-capacity optical transport.

- Telecommunications transport and backbone engineering teams
- Data center interconnection and cloud infrastructure functions
- Utility, energy, and rail communications networks
- Financial services and government network operations
- Managed service and enterprise network architecture teams

Learning Objectives

By the end of this course, participants will be able to:

- Apply fixed-grid and flexible-grid wavelength planning principles
- Build optical power, loss, and OSNR budgets
- Analyze dispersion, nonlinear effects, and amplifier placement
- Compare transponder, muxponder, ROADM, and coherent options
- Diagnose alarms and isolate optical path faults
- Evaluate resilient DWDM designs and commissioning evidence

Course Agenda

Day 1: DWDM Transport Foundations

- ITU-T G.694.1 Fixed-Grid and Flexible-Grid Channel Plan
- C-Band and L-Band Spectrum Allocation Map
- Transponder and Muxponder Signal Adaptation Matrix
- Optical Multiplexer and Demultiplexer Path Diagram
- Fiber Attenuation, Chromatic Dispersion, and PMD Profile

Day 2: Optical Link Engineering

- Optical Power and End-to-End Loss Budget Worksheet
- EDFA Gain, Noise Figure, and Placement Method
- OSNR Cascade Calculation and Margin Analysis
- Chromatic Dispersion and PMD Penalty Assessment
- Nonlinear Effect Risk and Launch-Power Decision Matrix

Day 3: ROADM and Coherent Design

- ROADM Degree and Add-Drop Path Architecture
- Colorless, Directionless, and Contentionless Node Matrix
- Coherent Modulation and Baud-Rate Selection Method
- ZR and ZR+ Pluggable Application Decision Map
- Metro and Long-Haul Protection Topology Comparison

Day 4: Commissioning and Fault Isolation

- Optical Spectrum Analyzer Test and Evidence Plan
- Channel Power Equalization and Tilt Correction Procedure
- Black-Link Interface Verification against ITU-T G.698.2
- Alarm Correlation and Fault-Domain Isolation Tree
- Commissioning Acceptance and Baseline Record Package

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Day 5: DWDM Engineering Practice

- Exercise: Build a Wavelength and Spectrum Allocation Plan
- Exercise: Calculate Span Loss, Amplifier Gain, and OSNR
- Exercise: Design a Resilient ROADM Optical Path
- Exercise: Diagnose Channel Degradation from Monitoring Evidence
- Capstone Exercise: DWDM Engineering and Commissioning Pack

Practical Exercises

The course uses suggested activities based on telecom, data center, utility, and enterprise transport scenarios.

- Suggested activity: allocate fixed-grid and flexible-grid channels while checking guard bands and spectrum use.
- Suggested activity: calculate loss, amplifier gain, OSNR, dispersion, and engineering margin for a multi-span route.
- Suggested activity: compare ROADM paths, coherent options, and protection choices for a capacity expansion.
- Suggested activity: trace degraded channel evidence through power, spectrum, alarms, and acceptance records.

FAQs

Who suits advanced DWDM network design training, and what does it assume?

Advanced DWDM network design training suits practicing optical transport professionals and assumes experience with fiber links, transmission equipment, network diagrams, and operational measurements.

How does advanced DWDM training differ from basic fiber-optic installation training?

Advanced DWDM training concentrates on wavelength planning, link engineering, amplifiers, ROADMs, coherent transmission, commissioning, and fault isolation; basic installation training concentrates on cable handling, connectors, splicing, and field installation.

Why is OSNR analysis important in DWDM network design?

OSNR analysis estimates how amplifier noise and span conditions affect channel performance, helping engineers evaluate margins, amplifier placement, and acceptance evidence across a route.

How do ROADMs change DWDM network operations?

ROADMs let operators route, add, or drop optical channels remotely, but require disciplined spectrum planning, power equalization, path verification, and fault-domain analysis.

Conclusion

Participants take a DWDM Engineering and Commissioning Pack back to work. It combines a channel plan, link and OSNR budgets, amplifier decisions, ROADM paths, coherent option records, test evidence, and a fault-isolation tree. The pack changes fragmented optical settings into a traceable design and operational baseline for resilient transport networks.