Nokia Fundamentals of Optical Network Design

Course outline

This course is designed for network engineers, network designers, and network planning personnel who need to learn the fundamental principles and practices for designing a basic optical network. Participants are introduced to industry best practices and Nokia methodology in optical network design, including customer requirements analysis, creation and use of 1830 Engineering and Planning Tool (EPT) design files, traffic matrix analysis, network element requirements and configurations, and resiliency/protection mechanisms. The course includes lab exercises and multiple case studies where participants design simple networks.

Course number
TOP00004

Duration
4 days (including lectures and hands-on lab exercises)

Exam
Nokia Fundamentals of Optical Network Design (4A0-250)

Credit toward certification
• Nokia Optical Network Design Expert
• Nokia Optical Network Architect

Recommended pre-requisites
Knowledge of the following topics:
• Optical transmission concepts and standard equipment
• Optical fiber types
• Basics of wavelength division multiplexing (WDM)
• Introduction to EPT

Course objectives
After completing the course, students should be able to:
• Identify various types of networks such as, synchronous digital hierarchy (SDH), Internet Protocol (IP), WDM
• Describe the uses of each type of network
• Explain the relationship between WDM networks and other types of networks
• Characterize the typical building blocks of a WDM network such as (amplifier, transponder)
• Explain the role of amplification in optical networks
• Describe the parameters and inputs required to design a basic WDM network
• Design a simple WDM network
• Analyze a simple WDM network design
• Describe the use of the Data Communication Network (DCN) in optical networking
• Describe the design process for basic WDM networks
• Check consistency among basic WDM network parameters and inputs
Describe external factors that can influence network design
Identify the key components of a traffic matrix
Identify the types of services requested (Ethernet, 10G, 100G)
Assess if the required protection scheme is supported in the proposed network
Decide if grooming is required to minimize wavelengths
Describe how EPT is used in the WDM network design process
Explain the main features of EPT
Identify the network layer(s) supported by EPT
Create a network design in EPT corresponding to basic requirements
Analyze network topologies for possible/preferred directions
Analyze routing of demands against customer requirements
Determine network element (NE) configuration details, such as power requirements, shelf filling rules
Analyze network element configuration against customer requirements.
Evaluate the completeness of a traffic matrix
Analyze possible routing constraints against requested protection
Verify EPT output against original requirements
Describe EPT reports and outputs

Course modules

- Module 1 – Course Introduction
- Module 1 – Introduction to Network Types
- Module 2 – Introduction to WDM Networks
- Module 3 – Introduction to Network Design
- Module 4 – 1830 Engineering and Planning Tool
- Module 5 – Study and Analyze EPT Files
- Module 6 – EPT Reports
- Module 7 – Case study: Designing a Small Optical Network
- Module 8 – Case study: Designing a Medium-sized Optical Network

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