Nokia Optical Networking Fundamentals

Course outline

This course is designed for engineers, IT personnel, and network planning personnel who need to learn the basic principles and practices related to optical networking. After an overall introduction of the main concepts related with the Wavelength Division Multiplexing (WDM) transmission systems (principles, standards and components), the participants are exposed to three main themes: optical network design, network elements and the network management system. Specifically, they will familiarize with the Engineering and Planning Tool (EPT), practice with Switched WDM nodes (including the Photonic Service Switch family – PSS-32 and PSS-24x) and manage the network through the Network Functions Manager for Transport (NFM-T). The last module is about using these three main components all together, from network design to network supervision.

This course introduces the foundations of optical networking, including network equipment, interworking principles, node functionalities, main transport technologies and basic concepts related to protection, restoration, control and management. The course provides the fundamental skills and knowledge for understanding basic use cases and includes lab exercises and multiple case studies where participants can familiarize themselves with 1830 EPT and NFM-T on simple 1830 PSS-based networks.

Course number
ER00835-V-1803

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

Exam
Nokia Optical Networking Fundamentals (4A0-205)

Credit toward certification
Nokia Optical Network Services Expert

Recommended pre-requisites
Knowledge of the following topics:
• Familiarity with TCP/IP network layers
• Familiarity with basic optical network components such as lasers and optical fibers
• Basic knowledge of optical network transmission concepts (e.g., signal, noise, etc.)
Course objectives
After completing the course, students should be able to:
• Describe optical signal propagation in optical networks
• Identify the typical building blocks of a WDM network
• Describe the functionalities of the building blocks
• Identify the main engineering parameters that characterize the network equipment
• Compute the power budget for an optical link
• Describe the concept of trail and service
• Identify the typical architectures of a WDM node
• Classify the network levels and topologies
• Get connected to 1830 PSS SWDM nodes using CLI, WebUI and NFM-T
• Describe the NFM-T infrastructure and list its components
• Explain survivability and availability principles
• Design a simple network using 1830 EPT
• Recognize the main alarms, conditions, logs and performance metrics
• Perform channel power monitoring using Wavelength Tracker functionalities
• Perform the commissioning of a single network (bus or ring) through NFM-T
• Introduce the main features of Generalized Multi-Protocol Label Switching (GMPLS) protocol
• Describe the GMPLS control plane architecture
• Verify the restoration implementation in NFM-T
• Verify the protection implementation in NFM-T
• Introduce the main features of the Generalized Multi-Protocol Label Switching (GMPLS) protocol
• Describe the GMPLS control plane architecture
• Verify the restoration implementation in NFM-T

Course modules
• Module 0 – Course Introduction
• Module 1 – Introduction to WDM networks
• Module 2 – Basics of SWDM nodes
• Module 3 – Basics of Optical Network Design
• Module 4 – Basics of Network Management System
• Module 5 – Protection and restoration
• Module 6 – SWDM-based optical network management

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