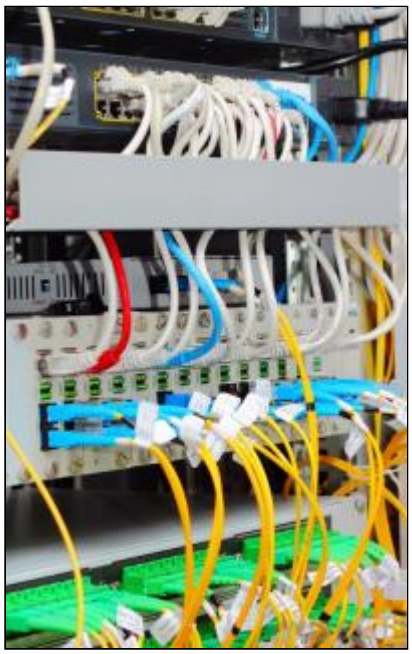
Understanding

SONET and Optical Networks

Course Description



During this powerful 2-day course, SONET technology fundamentals are examined in detail to create a solid technical foundation and understanding of these complex Technologies. The participants are led through applications, framing, protection switching and other key elements of the SONET architecture.

Optical networks are a key component of the global telecommunications infrastructure. Synchronous Optical Network (SONET) and Synchronous Digital Hierarchy (SDH) have become the worldwide standard for the interface and multiplexing of user information to optical networks. SONET/SDH systems allow much greater network flexibility and management over existing optical systems.

In this SONET SDH Training course, you will learn both the technology and applications of SONET/SDH. We will review the SONET/SDH system components as well as the end-to-end SONET/SDH network design process. We will also discuss the essentials of SONET/SDH synchronization, control, network management, and practical deployment issues. In short, this course will give you the knowledge and skills needed to understand and deploy this important technology.

SONET and SDH are the global standards for optical telecommunications transport they define the transport infrastructure for telecommunications networks worldwide and we will also be taken a look at DWDM technologies as well.

Students Will Learn

- **SONET Architecture**
- **SONET Signal**
- **SONET Network Components and their Functions.**
- **Examine Overhead Structures and their use in Testing and Management.**
- **SONET Sub-Rates, Super-Rates, Concatenation and Virtual Tributaries and Group Mapping**
- **Clarify SONET Applications and Ring Architectures**
- **Automatic Protection Switching, Performance Monitoring and Error Reporting as well as System Alarms are examined in detail.**
- **Exploring WDM and DWDM**
- **Current trends in the implementation of SONET & Optical Networks.**
- **And More**

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- **This knowledge is essential for the persons responsible or interested in Performance Monitoring, Network Design, Installation and Troubleshooting of Optical Technology Networks.**

Target Audience

Anyone requiring an understanding of SONET, SDH and Optical Networks. Outside Plant / Field, Installation and Maintenance, Central Office, Testing and Troubleshooting, Special Service, Circuit Provisioning, Software Engineers and anyone responsible or Interested in Designing or Implementing SONET, SDH and Optical Networks.

Prerequisites

None. A basic understanding of telecommunications transmission principles will be useful for students taking this course. This information can be obtained in our

TeleCom Today
Hands-On Basic Telephony & TeleCom Electronics
Hands-On Internetworking Essentials

Course Outline

Module I. OVERVIEW OF SONET

Digital Rates Compared
Multiplexed Transmission systems
A Global Network
Advantages of SONET
SONET Defined

Module II. SONET SIGNAL FUNDAMENTALS

Framing Structure
Signal Hierarchy
Multiplexed Rates
The Basic STS-1
Sub-Rate Signals

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Module III. SONET LAYERS AND COMPONANTS AND OVERHEAD

Path Terminating Equipment
Line Terminating Equipment
Section Terminating Equipment
Section Overhead - Error Checking & Synchronization
Line Overhead - Pointers & Protection Switching
Path Overhead - Payload Management
Concatenation

Module IV. SONET SUPER RATES, SUB-RATES & SDH

SDH Hierarchy & Framing
Virtual Tributaries
Converting the Asynchronous Signal to SONET
VT Types, Capacities and Group Mapping

Module V. SONET PROTECTION SWITCHING

Linear versus Ring
Path & Line
Two Fiber versus Four Fiber
Automatic Protection Switching
APS Initiation, Commands, Criteria, & Priorities
APS Switch Activation Bytes - K1 & K2

Module VI. SONET RINGS & APPLICATIONS

SONET Ring Inter-working
Local Access Rings and Network Backbones
SONET Ring Types & Applications
SONET Ring Objectives

Module VII. SONET PERFORMANCE MONITORING & TESTING

Monitoring SONET Signals
Fault Isolation and Sectionalization
Performance Data Collection and Reporting
Functions Supported at the OS/NE Interface
Network Access Test Points
Failure States, Signal Alarms and RDI\\\'s

Module VIII. DWDM FUNDAMENTALS

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WDM & DWDM Overview
Evolving DWDM
DWDM Applications and Deployment

Module IX. SONET APPLICATIONS - AN UPDATE

Optical Switching and Technologies
Cross-Connection by Wavelength
Local Access Rings
SONET in the Local Loop (SDSL)
Data Over SONET - Data Over Fiber
Fiber Advances and Future Developments

Module IX. APPENDIX

SONET Reference Documentation
- SONET OAM&P references
- SDII/SONET OAM&P references
- Bellcore/Tellabs documents
- SDH general references
- SDH OAM&P references
- WDM / DWDM references

Delivery Method

Instructor led with numerous exercises.

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

2 Days

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