

Transport Systems

Course Length	3 days
Course Code:	1370
Prerequisites	None. A basic understanding of telecommunications transmission principles will be useful for students taking course.
Course Overview:	This course focuses on an overview of common network transport systems including DS1, HDSL, HDSL2, DS3, SONET, and WDM/DWDM. Special emphasis will be put on network equipment, common applications and maintenance/repair procedures.
Required Equipment:	It is highly recommended that the student bring DS1/T1 test equipment to class. This will enable the student to learn on the actual equipment they will be using on a daily basis.

** This course can be customized or combined to meet specific system requirements**

Course Outline

Overview of DS1 Applications

DS1 Standards

DS1 Basics

- DS1 Network Equipment
- Analog vs Digital
- PCM (Pulse Code Modulation)
- TDM (Time Division Multiplexing)
- Framing
- Line Coding
- Timing

Fractional DS1



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Transport Systems

SLA (Service Level Agreements)

DS1 Installation and Maintenance

- BERT and Stress Patterns
- DS1 Test Access
- Types of Tests
- Monitoring Alarms and Errors
- Performance Monitoring
- Network Synchronization Testing
- Jitter

Overview of HDSL/2/4 Applications

HDSL/HDSL2/HDSL4 Standards

HDSL/HDSL2/HDSL4 Basics

- HDSL Network Equipment
- Conversion Process
- Distances, Parameters

HDSL Installation and Maintenance

- Qualifying the Loop/Cable
- HDSL Test Access
- Types of Tests
- Monitoring Alarms and Errors

Overview of DS3 Applications

DS3 Standards

DS3 Basics

- DS3 Network Equipment
- Channelized and Non-Channelized Multiplexers, DS3
- Repeaters
- M13 Framing
- C-Bit Framing
- Line Coding
- Timing

SLAs (Service Level Agreements)

Transport Systems

DS3 Installation and Maintenance

- BERT and Stress Patterns DS3 DS3 Test Access
- Types of Tests
- Monitoring Alarms and Errors
- Frequency
- Jitter

Overview of SONET Applications

SONET Basics

- SONET Network Equipment
- STS, SPE, and OC-x
- SONET Framing/Overhead
- Building the Signal
- SONET Rates and capacity
- Concatenated SONET signals
- Fiber Optic Overview
- SONET systems

SLA (Service Level Agreements)

SONET Installation and Maintenance

- Testing the Fiber Optic cable
- BERT and Stress Patterns
- SONET Test Access
- Types of Tests
- Monitoring Alarms and Errors
- Network Synchronization Testing

WDM/DWDM Applications

WDM/DWDM standards

WDM/DWDM Basics

- Network Equipment
- Building the signal
- The signal over Fiber
- Types of Systems

Transport Systems

WDM/DWDM Installation and Maintenance

Testing the Fiber Optic Cable

Test Access

Types of Tests

Monitoring Alarms and Errors

Next Generation Backhaul Transport System

WiMax