

Understanding  
**TeleCom Networks Today I**  
The Make-Up & Structure



### Course Description

The make-up and structure of telecommunications networks has changed drastically. These changes affect the equipment you purchase, the services you buy, the providers you can choose, and the media you use for transport. One call will no longer take care of all your needs. Without a full understanding of the changes that occurred and how they have affected voice and telephony services, products, and technology, you and your network will become obsolete.

This course will provide you with the basics of voice call processing, features, and hardware/software solutions. If your network is converging, you need to comprehend voice technologies to complement your data knowledge. If you are trying to sell or market services, this course will help you with the buzzwords, the technology, and the applications.

### Students Will Learn

- **Voice networks and telephony**
- **Digital networking**
- **Wireless, cellular, and satellite communications**
- **Service providers and public network architecture**
- **PBX, Centrex, ACD, and key systems**
- **Call processing**
- **CTI equipment and services**
- **Signaling, including SS7**

### Target Audience

This course is appropriate for data professionals needing voice training, consultants, executives, IT managers, marketing/sales, and network analysts, designers, engineers, and technicians.

### Course Outline

#### 1. Overview of Telecommunications

Understand the major events in U.S. telecommunications, including the AT&T infrastructure before and after divestiture, and the Telecom Act.

Short history of telecommunications

Types of connections

Differentiating types of calling services

Divestiture of AT&T and equal access

Introduction to the Telecom Act of 1996

U.S. regulatory bodies

Standards

## **2. Call Processing**

Explore telephone components, central office switches, the PSTN, and signaling Components of the telephone

Local loop connection

Central office switch

Public Switched Telephone Network (PSTN)

Signaling over POTS

## **3. Technology Fundamentals**

Examine communications methods and devices, how voice is transmitted, and the principles of multiplexing

Communications methods

Modulation/demodulation

Communications devices

Telephone

Codec

Modem

CSU/DSU

Electromagnetic spectrum

Types of media

Copper

Shielded/unshielded twisted pair

Coaxial cable

Fiber Optic

Multimode

Single mode

Wireless communications

System classes

Directional systems

Omnidirectional systems

Transmission impairments

Microwave communications

Intro to satellites

Geostationary

Low Earth Orbit (LEO)

Multiplexing

Frequency Division Multiplexing (FDM)

Time Division Multiplexing (TDM)

Wave Division Multiplexing (WDM)

## **4. Digital Access and Transport Systems**

Learn how voice signals are converted to digital, digital access and cross-connect systems, and high-speed services

Converting a voice signal to digital

North American Digital Hierarchy (NADH)

DS0

DS1 (T1)

DS2  
DS3  
European hierarchy  
E1  
E2  
E3  
Digital Access and Cross-connect System (DACS)  
Synchronous Optical Network (SONET)  
SONET/SDH hierarchy rates  
Concatenation - super rate payloads  
Virtual tributaries  
SONET topology  
Integrated Services Digital Network (ISDN)  
ISDN fundamentals  
Interface types  
Basic Rate Interface (BRI)  
Primary Rate Interface (PRI)  
Categories of equipment  
Applications for ISDN  
xDSL  
Installation challenges  
Asymmetrical bandwidth  
Asymmetric DSL (ADSL) for voice and data  
g.dmt  
G.lite  
High-Speed DSL (HDSL) symmetrical service

#### **5. Customer Premises Equipment and Services**

Comprehend PBX, Key systems, and ACDs. Understand Centrex and CTI  
Customer telephone system types  
Private Branch exchanges (PBXs)  
Key systems  
Hybrid system  
Automatic Call Distributors (ACDs)  
Computer Telephony Integration (CTI)  
Interactive Voice Response (IVR)  
Cabling, connectors and equipment (business environment)  
Centrex service  
Analog  
Digital (ISDN)

#### **6. Wireless Telecommunications**

Examine the evolution of wireless technology, cellular networks, and air interfaces. Understand AMPS, GSM, and PCS  
Components of a cellular network  
Mobile Telephone Switching Office (MTSO)  
Mobile subscriber units  
Cell sites  
Base station transceivers  
Cellular antennas  
Evolution of mobile telecommunications  
Cellular telephony  
Cellular concept - reusing frequencies  
Cell clusters  
Handoff between adjacent cells  
Air interfaces

Frequency Division Multiple Access (FDMA)  
Time Division Multiple Access (TDMA)  
Code Division Multiple Access (CDMA)  
Advanced Mobile Phone Service (AMPS)  
Second generation wireless technology  
Digital cellular  
Global System for Mobile Communications (GSM)  
Personal Communications Service (PCS)  
Other wireless technologies  
Cordless telephony  
Fixed wireless access  
Wireless local loop implementation  
Wireless PBX implementation

#### **7. The Future of Voice Telecommunications**

Examine the technologies driving voice and data convergence. Explore how voice and data is being carried over cable TV networks and how LECs are deploying networks.  
Migration from circuit to packet switching  
Convergence of voice and data for enterprise networks  
Voice over cable TV networks  
Digitizing voice over DSL

### **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