


# Introduction to Networking: Wide Area Networks

## OVERVIEW

Introduction to Networking: Wide Area Networks describes the concepts, technologies and functions of wide area networks (WANs) and how they help support broadband-related services such as Voice over Internet Protocol (VoIP). The course begins by explaining how WANs can be used to support voice and data services in commercial businesses through private branch exchange (PBX). It then discusses how WAN technology transports information across a network, focusing on cable modems, switched circuits, leased lines, Asymmetric Digital Subscriber Line (ADSL) and T-carriers. Also covered: the function of various WAN protocols, including High-Level Data Link Control (HDLC), Serial Line Internet Protocol (SLIP) and Integrated Services Digital Network (ISDN).

The course includes information on converged technologies and their supporting services, including VoIP, Asynchronous Transfer Mode (ATM) and frame relay. VoIP networks are explained and the market factors motivating enterprises to use this service are also explored. The course concludes with an explanation of private/public-switched telephone networks (PSTN), virtual private networks (VPNs) and PSTN remote access services.

### **Delivery Options:**

 Learning is a combination of online and textbook activities.

### **Completion Time:**

Varies based on the student's self-study pace, however, the maximum time allowed is six months from enrollment.

## BENEFITS

Upon completion students will:

- » identify the physical and logical technologies used for WAN communications
- » configure WANs to support network-based services such as VoIP
- » combine WAN and LAN technologies to build an end-to-end enterprise networking solution
- » identify layered WAN protocols to support networking applications, including remote access, VPNs and voice over technologies such as VoIP
- » earn three hours of college credit
- » understand how WANs relate to delivering voice and data services to commercial enterprises

### **Ideal for:**

Technical personnel supporting Internet-based services, including:

- » broadband technicians
- » network technicians
- » headend technicians
- » access bandwidth technicians
- » system technicians

(Continued)

## RELATED COURSES

*Students completing this course should then enroll in:*

- » Understanding Voice and Data Networks
- » Computers and Broadband Modems
- » Internetworking with TCP/IP

## TRAINING FEATURES

- » Knowledge-based, broadband and job-specific content
- » Highly illustrated and easy to read course materials
- » Curriculum advising
- » 24/7 lesson feedback and progress monitoring at [www.jonesncti.com](http://www.jonesncti.com)
- » Online testing

Visit [www.jonesncti.com/coursepolicy.htm](http://www.jonesncti.com/coursepolicy.htm) for important information on computer hardware/software requirements and student-to-student transfer and extension limitations



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## COURSE OBJECTIVES

Upon completing this course, students will be able to:

1. describe the development and operation of today's telecommunication infrastructure
2. identify the physical and logical technologies used for WAN communications
3. explain the operation of physical layer technologies, such as switched circuits, leased lines, T-carrier and Synchronous Network (SONET)
4. explain the operation of Data Link Layer technologies such as High-Level Data Link Control (HDLC), Serial Line Internet Protocol (SLIP) and Point-to-point Protocol (PPP)
5. explain the operation of higher layer protocols including Integrated Services Digital Network (ISDN), Frame Relay and Asynchronous Transfer Mode (ATM)
6. differentiate between packet switching, frame switching, frame relay and cell relay
7. understand the basic characteristics of 802.16 wireless technology

## COURSE OUTLINE

### 1. Fundamentals of WANs

Classification of networks, telecommunication, voice networks, voice network technology, PBX fundamentals, PBX features and functions, computer data and the voice network, digitizing the voice, integration of services and elements of the telecommunications business

### 2. WAN Concepts and Components

Physical and logical circuits, connecting to WAN circuits, analog networks, analog modems, modem compatibility, digital networks, microwave communications, satellite communications and end-to-end connectivity

### 3. Physical Layer WAN Protocols

Summary of data rates, dial-up and leased lines, SW56, VSAT, T-carriers and E-carriers, ADSL, cable modems and SONET

### 4. Data Link Layer WAN Protocols

A layer above, HDLC, SLIP, PPP and end-to-end connectivity

### 5. Higher-Layer WAN Protocols

ISDN concepts, protocols, implementation and frame relay concepts, protocols, implementation and X.25

### 6. WAN Solutions

ATM concepts, implementation, devices, sample network, SMDS and IEEE 802.16: the wireless last mile

### 7. Convergence of Communications Over WAN Technologies

Voice over alternative technologies, fundamental VoIP network components, factors driving the demand for packet telephony, private VPNs and PSTN remote access



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