Course Description

Discusses in depth the concept, theory and principles of Voice over Internet Protocol technology. Reviews the existing PSTN architecture. Examines VOIP Quality of Service, various speech coding techniques, the VOIP architecture, Session Initiation Protocol, Media Gateway Protocol and the relationship between VOIP and SS7. Lecture 3 hours per week.

Course Prerequisites/Co-requisites

Successful completion of ITN 208 or equivalent knowledge. Students must be able to read and write at a college level.

Course Objectives

Upon completion of this course, the student will be able to:

- Explain the advantages and disadvantage of VOIP
- Explain the basics of the Public Switched Telephone Network
- Describe how VOIP utilizes the Internet
- Describe various speech coding techniques
- Explain VOIP Quality of Service
- Describe VOIP architecture
- Use Session Initiation Protocols (SIP)
- Discuss Media Gateway Control
- Describe VOIP and SS7
- Compare and contrast ways to access the Network
- Discuss VOIP security

Major Topics to be Included

A. Introduction to VOIP
   1. VOIP overview
   2. VOIP Advantages
   3. VOIP Market
   4. VOIP Challenges
   5. VOIP Implementation

B. Public Switched Telephone Network
   1. Overview of PSTN
   2. The Enterprise Telephone Network
   3. Basic Telephony signaling
   4. Signaling System 7
   5. PSTN Services

C. The Internet
   1. Internet Organization
   2. OSI reference model
   3. Internet Protocol
   4. IP Addressing
   5. TCP and UDP
   6. Routing Protocols
   7. Real Time Transport Protocol
   8. Real Time Control Protocol
   9. Multicast
   10. IPv6
   11. DNS
   12. Path MTU
D. Speech-Coding Techniques
   1. Speech and Voice Quality
   2. Quantization
   3. Pulse Code Modulation
   5. Codecs

E. QoS in VOIP
   1. QOS
   2. SLA
   3. QOS parameters
   4. RSVP
   5. DIFFSERV
   6. MPLS

F. VOIP Architecture
   1. VOIP Signaling
   2. RSA Signaling
   3. Call Signaling
   4. Call Scenarios
   5. Control Signaling

G. Session Initiation Protocols (SIP)
   1. SIP Overview
   2. SIP Architecture
   3. SIP Messages
   4. SIP Message Sequence
   5. Basic Operation of SIP
   6. SIP Features and Services

H. Media Gateway Control
   1. Separation of Media and Call Control
   2. Softswitch Architecture
   3. Media Gateway Control Protocol (MGCP)
   4. Media Gateway Control (MEGACO)

I. VOIP and SS7
   1. SS7 Protocol Suite
   2. SS7 Network Architecture
   3. Signaling Transport (SIGTRAN)
   4. Internetworking SS7 and VOIP

J. Accessing the Network
   1. Modems
   2. ISDN
   3. DSL
   4. Cable modem
   5. LMDS
   6. Mobile Services

K. VOIP Security
   1. VOIP Security Architecture
   2. Vulnerability Assessment
   3. VOIP Security Policy
   4. Physical Security
   5. Terminal Registration
   6. Network Segregation
   7. LAN – WAN Connectivity
   8. VOIP Encryption