

CISC 3343: Telecommunications
Text: Data and Computer Communications, 10th ed.
Reference #1 - Wireless Communications and Networks 2nd ed.
Reference #2 - High Speed Networks and Internets 2nd ed.
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Course Outline

1. Introduction to Telecommunications

Chapter 1:

Chapter 9: Review Questions: 9.1 thru 9.10; HW Problems: 9.7 thru 9.14

- Telecommunications Basics
- A Communications Model
- Station Interconnection
- Switched Communications Networks
- Circuit Switching vs. Packet Switching Networks
- Packet Switching Alternatives
- Frame Relay Networks
- Asynchronous Transfer Mode Networks (ATM Networks)
- Broadcast Networks: Satellite Networks, Radio Networks, LANs
- The Internet
- Intranets and Extranets

2. Data Transmission Fundamentals

Chapter 3: Review Questions: 3.1 thru 3.10;

HW Problems: 3.1 thru 3.10, 3.15, 3.16, 3.18, 3.19, 3.21

Appendix A,D:

- Data, Signals, and Transmission
- Analog vs. Digital
- Channel Types: Simplex, Half-Duplex, Full-Duplex
- Parallel vs. Serial Transmission
- Asynchronous vs. Synchronous Transmission
- Time Domain Concepts
- Frequency Domain Representation of Signals
- Bandwidth
- Filters
- Transmission Impairments: Attenuation, Delay Distortion, Noise, Echo
- Channel Capacity

3. Data Encoding

Chapter 5: Review Questions: 5.1 thru 5.11; HW: 5.7, 5.8, 5.9, 5.10, 5.19, 5.20

Chapter 8: Review Questions: 8.1 thru 8.7; HW: 8.1, 8.7, 8.8, 8.9, 8.12, 8.13

Chapter 16: (Section 16.1): Review Question: 16.1

- Digital Data <---> Digital Signals (Transceivers)
- Digital Data <---> Analog Signals (Modems)
- Analog Data <---> Digital Signals (Codecs)
- Speech Encoding: PCM, ADPCM
- Analog Data <---> Analog Signals
- Multiplexing: FDM & TDM
- DSL Lines: T-1, E-1, ISDN, ADSL, xDSL
- ISDN BRI and PRI Channels and Services

Examination #1: [exam#1 outline](#)

4. Transmission Error Control:

Chapter 6: Review Questions: 6.1 thru 6.10; HW: 6.11, 6.12, 6.13, 6.14

Chapter 16: (Section 16.2): Review Questions: 16.2 thru 16.5; HW: 16.4, 16.7, 16.8

Reference #1 - Chapter 8:

- Transmission Error Sources

- Error Detection Techniques: Parity Checks, Block Codes, CRCs
- Error Correction Coding: Hamming Codes
- BCH, Reed-Solomon, and Convolutional Codes
- Low-Density Parity-Check Codes (LDPC)

5. Data Compression

Reference #2 - Chapters 19, 20, and 21:

- Lossless vs. Lossy Compression
- Huffman Coding
- Fax Compression: MH, MR, MMR
- Arithmetic Coding
- LZ and LZW Algorithms
- JPEG and MPEG Compression

Examination #2: [exam#2 outline](#)

6. Telephony Signaling

Lecture Notes

- Architecture of a Public Telephone Network
- The Local (Subscriber) Loop
- Making a Phone Call: Control Signaling
- In-Channel vs. Common Channel Signaling
- Loop Signaling: On-Hook Off-Hook Signaling
- Analog Telephony Signaling
- Digital Telephony Signaling: T-1, E-1
- DID, DNIS, and ANI Services
- Interoffice Signaling
- Signaling System No. 7 (SS7)
- SS7 Protocol Architecture: MTP, SCCP, TUP, ISUP

7. Wireless and Cellular Communications:

Chapter 10: Review Questions: 10.1 thru 10.10; HW: 10.2, 10.3, 10.4

Chapter 17: Review Questions: 17.1 thru 17.7; HW: 17.2

- Cellular Telephony
- The Mobile Telephone Switching Office (MTSO)
- Advanced Mobile Phone System (AMPS)
- Cellular and Cordless Network Reference Models
- IS-41 North American Cellular Signaling Protocol
- The Global System for Mobile Communications (GSM)
- IS-54 North American Digital TDMA Cellular Standard
- IS-95 North American Digital CDMA Cellular Standard
- Cellular Network Generations (1G, 2G, 3G, 4G)
- LTE and LTE-Advanced Technologies

8. Wireless LANs:

Chapter 13: Review Questions: 13.1 thru 13.6; HW: 13.1

- Overview
- IEEE 802.11 Architecture and Services
- Gigabit WiFi
- IEEE 802.11 Security Considerations

9. Wireless Networks:

Chapter 18: Review Questions: 18.1 thru 18.7;

- Fixed Broadband Wireless Access
- WiMAX/IEEE 802.16
- Bluetooth Overview

Final Examination: [final exam outline](#)