TCOM 500: Modern Telecommunication
Fall 2015
Instructor: Dr. Asha Mehrotra

Text Book: (1) Communications Networks, second Edition, 2004
Author: Alberto Leon-Garcia & Indra Widjaja, McGraw-Hill
(2) Reference Book: Data Communications and Networking,
Fifth Edition, Author: Behrouz A. Forouzan; McGraw-Hill

Brief summary of Topics: Details in class notes (Outline-Subject to change as we make progress)

**Week 1: September 2:** Communication Networks & Services, Telegraphs and Long-Distance Communications, Error Control Protocols, Computer to Computer Networks


**Week 3: September 16:** Digital Networks, Block and Stream Information, Transmission delay, Images, Digitization of Signals, Video Signals, Quality issues, Analog/Digital Communication, Digital Signals, Pulse Transmission, Channel BW, Noise impairment, S/N ratio concept, Shannon Capacity, Channel Types

**Week 4: September 23:** Sampling, Fourier Series, Spectrum Concept, Sampling, Digital transmission, Quantization, Communication channels and its representation in Frequency Domain, Channel distortion, Nyquist Pulse shape

**Week 5: October 7:** Line Coding and its spectrum, Unipolar and Bi-polar codes, Manchester Coding, BP Channel representation, Amplitude/Phase modulation, Signal constellation, Wireless and Wired media, Transmission over optical fiber

**Week 6: October 14:** Error Control, Parity check matrix, Code Quality, Parity check, Internet checksum, Polynomial code, Shift register implementation, Undetectable error pattern, Code design, Generating polynomial, Hamming code, RS-232 Connector, Synchronization, Synchronous Transmission
Week 7: October 21: Midterm


Week 9: November 4: Transport network, SONET based network, SONET Ring, Fiber Rings, Interconnection of Rings, WDM, Optical Switching, Circuit switches, X-bar switch, Multistage space switch, Clos switch, TSI switch, Hybrid switches, T-S-T switch design & Optical switching

Week 10: November 11: Telephone call, Local loop, Fiber-to-home, ISDN, Stored program, Message signaling, SS7 network, Traffic management, Traffic modeling, Blocking probability, Routing, Radio and cellular communication, Signaling over cellular network, GSM standard and future of Cellular

Week 11: November 18: Multiple Access Communication, Media sharing, Satellite as a transport vehicle, Cellular channelization, Polling, Random Access Techniques, Wireless LAN, Delay-BW product, MAC future, ALOHA for data transport, Slotted Aloha and CSMA

Week 12: November 25: Thanks Giving --HOLIDAY

Week 13: December 2: Revision/Discussion/Suggestion (Free discussion)

Week 14: December 16: FINAL EXAM

Grading: Homework 25%, Midterm Exam 25%  
Final Exam 50% (Comprehensive cover whole course)