

# TLEN5310

## Telecommunications Systems

### Course Description

Deals with certain fundamental terminology and technical concepts in telecommunications. It is required for all participants in the Telecommunications Program. Provides an in-depth look at basic telecommunications terminology and concepts. The course introduces the student to both voice and data communications as well as modulation and multiplexing theory.

### Outline

Basic terminology and concepts Basic networks Terminology - Central office, PBX, Centrex, Trunks, etc. Introduction to the Public Switched Network Cable and the local loop Basic switching functions North American Numbering Plan Basic signaling theory Typical call Alternative media Voice Communications Multiplexing and modulation Analog and digital Basic telecommunication circuits Signaling types Modem, Codec and channel banks Bandwidth, Signal to Noise, dB, loss, etc. Synchronous/asynchronous transmission Switching architectures Protocols Multi-media Circuit/packet switching Modulation and multiplexing AM, PM and FM PAM, PWM and PPM PCM, DPCM, DM and ADPCM SDM, FDM and TDM ASK, PSK and FSK Signal analysis Description of signals - time and frequency Spectral/Fourier series analysis of a signal Filters, detectors - envelop and coherent Information theory Bits and bauds Nyquist, Shannon and Carson Rules Compression/Coding Error detecting/correction techniques Transmission systems Open wire, Twisted pair cable, Coaxial cable and Fiber optic cable Radio/broadcast Microwave, Satellites, Cellular and PCS Introduction to Traffic Theory Loss and delay systems

### Prerequisites

TLEN 5300 (Telecommunications Theory and Applications) or equivalent with instructor consent

**REQUIRED TEXT:** Digital Telephony, Third Edition, John Bellamy, and Telecommunication Sciences - Telecom Technology (Gerald Mitchell), Recitation Notes by Brian Smith (All of these can be purchased at the CU bookstore 303 492-3444 or 800 255-9168)

### Hardware/Software

Internet and e-mail access required. Students will access course materials using CULearn. Go to <https://culearn.colorado.edu/> for logon information and browser settings.

**Instructor:** Kenneth Baker

**Phone:** 303-735-2684

**FAX:** 303 492-1112

**E-mail:** Kenneth.Baker@colorado.edu