

Course Title: Communications Systems

Course Code: ETEG 301

Credit Hours: 3

Course Description:

The course provides an overview of communication systems and applications.

Course Contents:

Unit 1: Elements of Analog Communication System

History of telecommunication; Applications of communications system for personal, industrial and device automation; Amplitude Modulation (AM) and demodulation- Single Sideband Suppressed Carrier (SSB-SC), Double Sideband Suppressed-Carrier (DSB-SC); Vestigial Side Band (VSB) modulation and applications; Frequency Modulation (FM) and demodulation: Narrow Band FM, Wide band FM.

Unit 2: Digital Communication System and Antennas

Digital modulation, demodulation and transmission; Signal to Noise Ratio; Analog to Digital Converter (ADC), Digital to Analog Converter (DAC); Overview of cellular mobile evolution and basic features; Antennas- Introduction, Types and Properties.

Unit 3: Communication Networks

Networking concepts, Local access, Trunking, International signaling, Call establishment; Analog and digital networks; Speech coding and multiplexing; Data communications concepts, Internet, Wired and Wireless Local & wide area networks; Short Message Service (SMS), Multimedia Messaging Service (MMS).

Unit 4: Radio Transmission Systems

Broadcasting concepts and wave propagation; High frequency (HF) systems; Narrowband System; Spread spectrum system- CDMA; Cellular mobile communication system; Digital broadcasting system- Direct to Home (DTH); Ad Hoc system; Radar systems; Lidar system.

Unit 5: Optical Fiber Systems

Light wave generation and detection, Optical modulation techniques, Fiber performance, Terminating, Splicing; Optical Ground Wire (OPGW), All Dielectric Self-Supporting Optical Cable (ADSS).

Unit 6: Satellite Systems

Elements of satellite communication system, Common satellite band; Orbital dynamics, Geo-stationary satellite, Lower Earth Orbit (LEO) satellite, Medium Earth Orbit (MEO) satellite, Global Navigation Satellite System (GNSS), Link budgets calculation, Antennas used in satellite system, Satellite broadcasting services.

Unit 7: Communication for Hybrid Networks

Power Line Communication (PLC); Internet of Things (IoT); Device to Device (D2D) communication; Zigbee; Wi Fi; Z- Wave.

References:

1. D. Roddy, J. Coolen, *Electronic Communication Systems*, Pearson
2. G. Kennedy, B. Devis, *Electronic Communication Systems*, Tata Mc Graw Hill
3. T. Anttalainen, *Introduction to Telecommunications Network Engineering*, Artech House 1999

Evaluation:

In-Semester Evaluation: 50%

End-Semester Evaluation: 50%