THIRD YEAR

Digital Communication II	COE309
Prerequisite: COE212 and COE302	**(3-2-1-2)**

Characterization of Fading Multipath Channels, The Effect of Signal Characteristics on the Choice of a Channel Model, Diversity Techniques, Digital Signaling over a Frequency-Selective, Slowly Fading Channel, Binary and M-ary Signaling over a Frequency-Nonselective, Slowly Fading Channel, Coded Waveforms for Fading Channel, Probability of Error. Hard and Soft Decision, Performance of Convolution Codes, Constant Weight and Concatenated Codes, Analysis and Performance of TCM for Fading Channels. Model of a Spread Spectrum Communications System, DS Spread spectrum Signals, Rake Receivers, Multi-user Detection, Frequency Hopped Spread Spectrum Signals, Other types of Spread Spectrum Signals, Spread Spectrum in multipath channels. Multiple Access Techniques (CDMA, TDMA, FDMA, SDMA), Capacity of Multiple Access Systems. Path Loss and Shadowing; Tx-Rx signal models; free-space path loss; ray tracing; empirical path-loss models. Statistical multipath channels: Time varying channel impulse response; narrowband fading models; wideband fading models. Capacity in AWGN; Capacity of flat-fading channels; channel and system model; channel distribution information (CDI) known; channel side information at transmitter and receiver; capacity with receiver diversity; capacity of frequency-selective fading channels.

Practical part: *Visualization of Propagation Channels. Transmission of Binary Signals through Multipath Channels. DS-CDMA, TDMA, FDMA, FH-SSS, Rake Receiver. Path Loss and Shadowing. Time Varying Channel Impulse Response.*