AKU B.E./B.Tech ENTC Sem 5 syllabus

Digital Communication

Digital Communication
Credits: 04

Unit I : Digital Transmission of Analog Signal
Introduction to Digital Communication System: Block Diagram and transformations, Basic Digital Communication Nomenclature. Digital Versus Analog Performance Criteria, Sampling Process, PCM Generation and Reconstruction, Quantization Noise,Non-uniform Quantization and Companding, PCM with noise: Decoding noise, Error threshold, Delta Modulation, Adaptive Delta Modulation, Delta Sigma Modulation, Differential Pulse Code Modulation, LPC speech synthesis.

Unit II :Baseband Digital Transmission (7Hrs)
Digital Multiplexing: Multiplexers and hierarchies, Data Multiplexers.Data formats and their spectra, synchronization: BitSynchronization, Scramblers, Frame Synchronization.Inter-symbol interference,Equalization

Unit III : Random Signal & Noise
Introduction, Mathematical definition of a random process, Stationary processes, Mean, Correlation &Covariance function, Ergodic processes, Transmission of a random process through a LTI filter, Power spectral density, Gaussian process, noise, Narrow band noise, Representation of narrowband noise in terms of in phase & quadrature components.

Unit IV : Baseband Receiver
Signal space representation : Geometric representation of signal, Conversion of continuous AWGN channel to vector channel, Likelihood functions, Coherent Detection of binary signals in

presence of noise, Optimum Filter, Matched Filter, Probability of Error of Matched Filter, Correlation receiver.

Unit V : PassbandDigital Transmission
Pass band transmission model, Signal space diagram, Generation and detection, Error Probabilityderivationand Power spectra of coherent BPSK, BFSK and QPSK. Geometric representation, Generation and detection of - M-ary PSK, M-ary QAM and their error probability, Non-coherent BFSK, DPSK.

Unit VI : Spread Spectrum Modulation
Introduction, Pseudo noise sequences, A notion of spread spectrum, Direct sequence spread spectrum with coherent BPSK, Signal space dimensionality & processing gain, Probability of error, Concept of jamming, Frequency hop spread spectrum.

Text Books:
1. A.B Carlson, P B Crully, J C Rutledge, —Communication Systems‖, Fourth Edition, McGraw Hill Publication.
2. Simon Haykin, —Digital Communication Systems‖, John Wiley&Sons, Fourth Edition.

Reference Books:
1. P RamkrishnaRao, Digital Communication, McGrawHill Publication
2. Ha Nguyen, Ed Shwedyk, —A First Course in Digital Communication‖, Cambridge University Press.
3. B P Lathi, Zhi Ding —Modern Analog and Digital Communication System‖, Oxford University Press, Fourth Edition.
4. Bernard Sklar,Prabitra Kumar Ray, —Digital Communications Fundamentals and Applications‖ Second Edition,Pearson Education
5. Taub, Schilling, —Principles of Communication System‖, Fourth Edition, McGraw Hill.