GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. Wireless Communication Technology (EC)

Semester: I

Subject Name: **Modern Digital Communication Techniques (Major Elective-I)**
Subject Code: **714403**

Sr. No	Course Content
1	**Introduction:** Functional architecture, coded and encoded digital communication system architecture, Types of network and services, Performance criterion and link budgets.
2	**Digital Modulations:** PSD, Data pulse stream, M-ary Markov source, convolutionally coded modulation, continuous phase modulation (CPM), Scalar and vector communications over memory less channel, scalar receiver, BER Performance, detection criterion. QAM,QPSK,FSK,MSK.
3	**Signal Design for Band limited Channels:** Characterization of Band-Limited Channels, Signal Design for Band-Limited channels, Design of Band-Limited Signals for No Inter-symbol Interference, the Nyquist Criterion, Design of Band- Limited Signals with Controlled ISI-Partial-Response Signals, Data Detection for Controlled ISI, Signal Design for Channel with Distortion.
4	**Communication through Band-Limited Linear Filter Channels:** Optimum Receiver for Channels with ISI and AWGN, Optimum Maximum-Likelihood Receiver, A Discrete-Time Model for a Channel with ISI, The Viterbi Algorithm for the Discrete-Time White Noise Filter Model, Performance of MLSE for Channels with ISI, Linear Equalization, Peak Distortion Criterion, Mean-Square-Error (MSE) Criterion, Performance Characteristics of the MSE Equalizer, Fractionally Spaced Equalizers, Baseband and Pass band Linear Equalizers, Decision-Feedback Equalization, Coefficient Optimization, Performance Characteristics of DFE, Predictive Decision-Feedback Equalizer, Equalization at the Transmitter-Tomlinson-Harashima Preceding, Reduced Complexity ML Detectors, Iterative Equalization and Decoding-Turbo Equalization.
5	**Coded Digital Communication:** Architecture, interfacing, detailing, Synchronization, Block coded digital communication system, performance, types of binary block codes, Shannon channel coding theorem, linear block codes, convolution coded digital communication system, representation of convolution codes, decoding, problems of decreasing errors, sequencing and threshold decoding

6	**Multichannel and Multicarrier Systems:** Multichannel Digital Communications in AWGN Channels, Binary Signals, M-ary Orthogonal Signals, Multicarrier Communications, Capacity of a Non-ideal Linear Filter Channel, an FFT-Based Multicarrier System, Minimizing Peak-to-Average Ratio in the Multicarrier Systems
7	**Spread Spectrum Signals for Digital Communications:** Model of Spread Spectrum Digital Communication System, Direct Sequence Spread Spectrum Signals, Error Rate Performance of the Decoder, Some Application of DS Spread Spectrum Signals, Effect of Pulsed Interference on DS Spread Spectrum System, Excision of Narrowband Interference in DS Spread Spectrum Systems, Generation of PN sequences, Frequency-Hopped Spread Spectrum Signals, Performance of FH Spread Spectrum Signals in an AWGN Channel, Performance of FH Spread Spectrum Signals in Partial-Band Interference, A CDMA System Based on FH Spread Spectrum Signals, Other Types of Spread Spectrum Signals, Synchronization of Spread Spectrum Systems.

Text Books:

1. John G. Proakis, Digital Communications, 4th Edition, Mc Graw Hill Publications.
2. M.K.Simon,S.M.Hinedi and W.C.Lindsey, Digital communication techniques:signaling and detection, Prentice Hall India 1995

Reference Books:

1. Simon Haykin, Digital communications, John wiley and sons.1998
2. Wayne Tomasi, Advanced Electroncis communication systems 4th edition Pearson edu. 1998
3. B.P.Lathi, Modern Digital and analog communication systems, 3rd edition ,oxford univ. 1998