GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 2

Electrical Engineering

Subject Name : Digital Signal processing

Sr No.	Course Content
1	Discrete time systems, z-transform, LTI systems, description by difference equations, system function, Impulse response and frequency response, Realization structures for IIR and FIR digital systems.
2	Discrete convolution, Discrete Fourier Transform and Fast Fourier Transforms, Inverse DFT, Algorithms for efficient computation of DFT and FFT. Fast convolution. Correlation.
3	Implementation of DSP algorithms, Block diagram and signal flow graph representations, Basic IIR and FIR filter structures, Cascaded, parallel and lattice realizations, computational complexity., Finite word length effects and quantization errors
4	Digital filter design. FIR and IIR filters, linear phase filters, design techniques for IIR and FIR filters,. Analysis of finite word length effects.
5	Estimation of Auto-correlation and Power Spectra of random signals. Non-parametric methods – averaging periodograms, Welch method, Blackman and Tukey method, Parametric methods, AR, MA and ARMA models, Yule Walker method, Levinson-Durbin algorithm
6	Multi-rate digital signal processing. Poly-phase decomposition, multistage decimators and interpolators, Digital filter banks. Adaptive filtering, minimum mean square error criterion, Wiener filter, LMS adaptive algorithm
7	General purpose DSP processors, Implementation of DSP algorithms on General purpose processors, Special purpose DSP processors –Hardware digital filters and FFT processors.
8	Applications in voice processing, radar, Image processing.

References:

1. Digital Signal Processing: Principles, Algorithms and Applications: 3rd Ed.- Prentice-Hall (India)- Proakis and Manolakis
2. Digital Signal Processing: A Computer Based Approach: Tata McGraw Hill- S.Mitra
3. Digital Signal Processing : Rabiner and Gold
4. Digital Signal Processing : Johnson