

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E

Communication Engineering

Subject Name: **Biomedical Signal Processing**

Sr.No	Course content
1	Introduction to Human physiological system, Types of Biomedical signals: ECG, EEG, EMG, EOG, ERG etc.
2	Introduction to short term Fourier transform (STFT), Design of filters using Hanning window, Hamming window, Kaiser window, Haar window
3	Introduction to Electrocardiograph and ECG signals, Types of interferences in ECG signals, ECG signal analysis and noise removal, Detection of ECG abnormalities, ANN-based ECG analysis system
4	Introduction to Electroencephalograph and EEG signals, EEG signal analysis, Kurtosis coefficients, Independent component analysis (ICA), Principle component analysis (PCA)
5	Autoregressive (AR) Model, Fast Fourier Transform (FFT) and Inverse Fast Fourier Transform (IFFT), Data Compression methods: Arithmetic coding, Huffman coding, LZW coding, Bit-plane coding
6	Introduction to Medical image compression: Discrete cosine transform (DCT), Walsh-Hadamard Transform (WHT), Wavelet transform (WT), JPEG, JPEG 2000, SPIHT coding

Reference Books:

1. Willis Tompkins, Biomedical Signal Processing, PHI
2. A.V. Oppenheim and Schafer, Discrete Time Signal Processing, Prentice Hall
3. John G. Proakis and D.G. Manolakis, Digital Signal Processing: Principle, Algorithms and Applications, Prentice Hall