GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

Bio-Medical Engineering

Subject Name: **Signals and Systems**
Subject Code: **150303**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Internal Assessment (I)**
4	0	2	6	70	30	50

Sr. No	Course content
1.	**SIGNALS AND SYSTEMS** Size of a signal,Some useful Signal Operations, classification of Signals, some Useful Signal models,even and Odd Functions,Systems,classification of Systems,System Model:Input-Output Description.
2.	**TIME-DOMAIN ANALYSIS OF CONTINUOUS-TIME SYSTEMS** Introduction, System Response to Internal Conditions: The Zero-Input Response, the Unit Impulse Response h (t), System Response to External Input: Zero-State Response, Classical Solution of Differential Equations, System Stability, Intuitive Insights into System Behavior.
3.	**TIME-DOMAIN ANALYSIS OF DISCRETE-TIME SYSTEMS** Introduction, Useful Signal Operations, Some Useful Discrete-Time Signal Models, Examples of Discrete-Time Systems, Discrete-Time System Equations, System Response to External Input: The Zero-State Response.
4.	**DISCRETE-TIME STSTEM ANALYSIS USING THE z-TRANSFORM** The z-Transform, Some Properties of the z-Transform, z-transform solution of linear difference equations, System Realization, Frequency response of discrete time systems, Frequency response from pole zero location, Digital processing of analog signals, Connection between the Laplace Transform and z – transform, Bilateral z – transform.
5.	**CONTINUOUS TIME SIGNAL ANALYSIS: THE FOURIER TRANSFORM** Aperiodic signal representation by Fourier integrateral, Transforms of some useful functions, some properties of Fourier transform, Signal transmission through LTIC systems, Ideal & practical filters, signal energy, application to communications: amplitude modulation, data truncation: window functions.
6.	**SAMPLING: THE BRIDGE FROM CONTINUOUS TO DISCRET** The sampling theorem, signal reconstruction, analog to digital conversion, dual of timing sampling: spectral sampling, numerical computation of the Fourier transform: the discrete Fourier transform, fast Fourier transform.

Reference Books:

1. Linear Systems and Signals- B P Lathi, oxfore press, 2nd edition.