

Course Code	Course Title	L	T	P	C
1151BM108	Signals And Systems	3	2	0	4

**a) Course Category**

Program core

**b) Preamble**

Biomedical Engineering deals with signals from human body which has to be processed to get useful output. The signal can be either analog or converted digital signal. Processing of both the signal type requires some mathematics. This course provides the basic knowledge on the required mathematics for further processing of signals

**c) Prerequisite**

Transforms and Partial differential Equations

**d) Related Courses**

Digital Signal Processing, Image Processing

**e) Course Outcomes**

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Classify the continuous/discrete time signals/systems from the given equation according to their properties	K3
CO2	Compute the spectrum of continuous periodic and aperiodic signals using Fourier series	K3
CO3	Compute the spectrum of discrete periodic and aperiodic signals using Z transform	K3
CO4	Solve problems on analog to digital signal conversion and Aliasing	K3
CO5	Analyzing state space model for signal flow graph	K3

## f) COURSE CONTENT

<b>UNIT-I Classification of signals and systems</b>	<b>15</b>
Continuous Time signals (CT signals) – Discrete Time signals (DT signals) – Elementary CT signals and DT signals – Basic properties of signals , Classification of CT and DT signals – Basic properties of systems – Classification CT systems and DT systems – Linear time invariant systems and properties	
<b>UNIT-II Continuous time system and signal analysis</b>	<b>15</b>
Fourier series analysis: Spectrum of Continuous Time signals – Physical meaning of Fourier series. Fourier Transform in signal analysis and system analysis: Differential equation – block diagram representation – convolution integral and impulse response.	
<b>UNIT-III Discrete time signal and system analysis</b>	<b>15</b>
Discrete Fourier series, Fourier transform of discrete sequence, Z-transform and its properties, inverse z-transforms; Stability analysis, frequency response – Convolution..	
<b>UNIT-IV Representation of discrete time signals</b>	<b>15</b>
Sampling of Continuous Time signals and aliasing – DTFT and properties –physical meaning of DTFT – z transform in Discrete Time signal analysis	
<b>UNIT-V State Space analysis of a discrete system</b>	<b>15</b>
State space model, parallel realization, cascade realization, time domain solution of the state equation, frequency domain solution of the state equation, linear transformation of state vectors.	

**TOTAL : 75 periods**

### TEXT BOOKS

1. Haykin “ Signals and Systems”, Khanna Publishers, 2000

### REFERENCE BOOKS

1. Ashok Ambardar, “Analog and Digital Signal Processing”, Thomson Learning Inc., 1999
2. Douglas K.Lindner, “Signals and Systems”, McGraw-Hill International, 1999.
3. Allan V. Oppenheim et al, “Signals and Systems”, 2nd edition, Prentice Hall of India Pvt. Ltd, 2004