Nirma University
School of Technology, Institute of Technology
Electronics & Instrumentation Engineering
B. TECH. SEMESTER -IV

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Course Code	**2EI401**
Course Title	**Signals and Systems**

Course Learning Outcome:
At the end of the course, students will be able to -

1. illustrate the representations and classifications of the discrete time signals and systems
2. analyze the linear time invariant systems in time domain
3. apply fourier transformation for discrete time signals and linear time invariant systems

Syllabus	**Teaching Hours**
UNIT 1: Sampling	
Sampling, Sampling Theorem, Nyquist Rate of Sampling, Effect of Under sampling, Sampling Techniques, Data Reconstruction, Sampling of Bandpass Signal	**6**
UNIT 2: Signals and Systems	
Representation of Discrete-time Signals, Elementary Signals, Basic Operations on Signals, Classification of Signals, Classification of Systems.	**10**
UNIT 3: Signal Analysis	**6**
Analogy between Vectors and Signals, Orthogonal Vector Space, Orthogonal Signal Space, Orthogonality in Complex Functions	
UNIT 4: Fourier Transforms	
Fourier Transform Representation of Non-Periodic Functions, Magnitude and Phase Representation of Fourier Transform, Existence of Fourier Transform, Fourier Transform of Standard Signals, Properties of Continuous Time Fourier Transform and Discrete Time Fourier Transform, Fourier Transform of a Periodic Signal, System Analysis with Fourier Transform.	**9**
UNIT 5: Signal Transmission Through Linear System	
Properties of Linear Time Invariant Systems, Transfer Function of LTI System, Filter Characteristics of Linear Systems, Distortion less Transmission through a System, Signal Bandwidth, System Bandwidth, Ideal Filter Characteristics.	**6**
UNIT 6 : Convolution and Correlation of Signals	**8**

Concept of Convolution, Properties of Convolution, Convolution Theorems, Graphical Procedure to Perform Convolution, Signal Comparison, Energy Density Spectrum, Power Density Spectrum, Relation between Autocorrelation Function and Energy/Power Spectral, Relation between Convolution and Correlation

Self Study:

The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

References:

(1) A. Anandkumar, Signals and Systems, PHI.
(2) S. Pilani, Signals and Systems, Ane Books Pvt. Ltd.
(3) Tarunkumar Rawat, Signals and Systems, Oxford.