NIRMA UNIVERSITY
Institute of Technology
B.Tech. in Electrical Engineering
Semester-III

L	T	P	C
2	1	0	3

Course Code	2EE302
Course Title	Signals and Systems

Course Learning Outcomes (CLO):
At the end of the course, students will be able to-
1. interpret the signals in various forms for analysis
2. analyse various signals in time domain and frequency domain systems
3. obtain Fourier analysis of continuous time and discrete time signals

Syllabus: **Teaching   Hours: 30**

Unit-0: Introduction   **04**
Types of signals, Basic continuous-time signals, Basic discrete-time signals, Classification of signals and systems, Sampling theorem.

Unit-1: Linear Time-Invariant systems   **06**
Response of a continuous-time LTI system, Convolution, Properties of continuous-time LTI systems, Eigen-functions of continuous-time LTI systems, Systems described by differential equations, Response of a discrete-time LTI system and convolution sum, Properties of discrete-time LTI systems, Eigen-functions of discrete-time LTI systems, Systems described by difference equations.

Unit-2: The z-Transform and discrete-time LTI systems   **06**
The z-transform, Concept of Region of Convergence, conversion from Laplace to z-transform, z-transforms of some common sequences, Properties of the z-transform, Inverse z-transform, System function of discrete-time LTI System.

Unit-3: Fourier analysis of continuous-time signals   Fourier series   **06**
representation of periodic signals, Fourier transform, Properties of the continuous-time Fourier transform, Frequency response of continuous-time LTI systems, Introduction to FIR and IIR filters.

Unit-4: Fourier analysis of discrete-time signals   **08**
Discrete Fourier series, Fourier transform, properties of the Fourier transform, frequency response of discrete-time LTI systems, System response to sampled continuous-time sinusoids, discrete Fourier transform, difference between DTFT and DFT, concept and algorithms of FFT

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.

Tutorial: **Tutorial Hours: 15**
This shall consist of at least 08 tutorials based on the above syllabus.

References:

1. Alan V. Oppenheim, Alan S.Willsky, S .Hamid Nawab, Signals and Systems, Pearson Education.
2. Hwei P. Shu, Signals and Systems, Schaum outline, McGraw-Hill Co Ltd.
3. John G. Proakis and Dimitris G. Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, Pearson.
4. M. J. Roberts, Signals and Systems: Analysis using Transform method and MATLAB, Tata McGraw-Hill Co Ltd.
5. S. Haykin, Barry Van Veen, Signals and Systems, Wiley India.
6. M. H. Hayes, Digital Signal Processing, Schaum's outline series, Tata McGraw-Hill Co Ltd..
7. Ludeman L. C., Fundamentals of Digital Signal Processing, Wiley India.

L = Lecture, T = Tutorial, P = Practical, C = Credit

w.e.f. academic year 2019-20 and onwards