Institute:	Institute of Technology
Name of Programme:	B.Tech. Electronics & Communication Engineering
Course Code:	2EC401
Course Title:	Signals and Systems
Course Type:	(■ Core/ ☐ Value Added Course/☐ Departmental Elective/ ☐ Institute Elective/ ☐ University Elective/ (☐ Open Elective Any other)
Year of Introduction:	2023-24

Credit Scheme

L	T	Practical component				C
		LPW	PW	W	S	
2	1	-	-	-	-	3

Course Learning Outcomes (CLOs):

At the end of the course, students will be able to-

1. classify the signals and evaluate properties of Linear Time-Invariant (LTI) Systems BL 2
2. apply the convolution to evaluate the response of the LTI systems BL 3
3. analyse LTI systems in time domain BL 4
4. analyse LTI systems in frequency domain BL 4

Unit No.	Syllabus	Teaching hours
I	**Introduction of Signals and Systems:** Classification of Signals, Basic Operations on Signals, Elementary Signals, Overview of systems, Properties of Systems	**07**
II	**LTI System and Convolution:** Time-Domain Representations of Linear Time- Invariant Systems: Convolution Sum, Convolution Integral, Impulse Response, Relations between LTI System Properties and the Impulse Response, Step Response, Differential and Difference Equation Representations of LTI Systems, Block Diagram representations, State variable Descriptions of LTI Systems	**11**
III	**Fourier Representation:** Fourier Representations for Four classes of signals, Continuous Time Fourier Series, Continuous Time Fourier Transform, Discrete Time Fourier Transform, Properties of Fourier Representations: Linearity and Symmetry Properties, Convolution Property, Differentiation and Integration Properties, Time and Frequency-Shift Properties, Multiplication Property, Scaling Property, Parseval Relationships, examples and applications, Frequency response of LTI Systems, sampling theorem and its implications	**12**

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.

List of Tutorial:

Sr. No.	Topic	Hours
1.	Introduction to MATLAB	1
2.	Signal Generation using MATLAB	1
3.	Examples based on Signal Classification	1
4.	Examples based on periodic and aperiodic signals	1
5.	Examples based on Even and Odd signals	1
6.	Examples based on Energy and Power signals	1
7.	Examples based on Operations on Signals	1
8.	Examples based on System Classification	1
9.	Examples based on Convolution for finite period	1
10.	Examples based on Convolution for infinite period	1
11.	Examples based on impulse response properties	1
12.	Examples based on Fourier Series	1
13.	Examples based on Properties of Fourier Series	1
14.	Examples based on Fourier Transform	1
15.	Examples based on properties of Fourier Transform	1

Suggested Readings:

1. Simon Haykin, Signals and Systems, John Wiley
2. Oppenheim & Wilsky, Signals & Systems, PHI
3. Tarun Ravat, Signals and systems Oxford University Press