

**LESSON PLAN (SUMMER-2024)**

<b>Discipline: ETC</b>	<b>Semester:6th</b>	<b>Name of the Teaching Faculty: SOMA DASH,LECTURER E&amp;TC, GP BHUBANESWAR</b>
<b>Subject: Digital Signal Processing</b>	<b>No of Days /per week class allotted: 4</b>	<b>Semester From date: 16.01.2024 To date: 26.04.2024 No of Weeks:14</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory / Practical Topics</b>
<b>1st</b>	1st	<b>1. Introduction of Signals, Systems &amp; Signal processing(10)</b> 1.1 Basics of Signals, Systems & Signal processing- basic element of a digital signal processing system -
	2nd	Compare the advantages of digital signal processing over analog signal processing.
	3rd	1.2 Classify signals - Multi channel& Multi-dimensional signals-Continuous time verses Discrete -times Signal. -
	4th	Continuous valued verses Discrete -valued signals.
<b>2nd</b>	1st	1.3 Concept of frequency in continuous time & discrete time signals- Continuous-time sinusoidal signals-Discrete-time sinusoidal signals- Harmonically related complex exponential.
	2nd	1.4 Analog to Digital & Digital to Analog conversion & explain the following. a. Sampling of Analog signal,
	3rd	b. The sampling theorem.
	4th	c. Quantization of continuous amplitude signals, d. Coding of quantized sample.
<b>3rd</b>	1st	e. Digital to analog conversion.
	2nd	f. Analysis of digital systems signals vs. discrete time signals systems.
	3rd	<b>2. DISCRETE TIME SIGNALS &amp; SYSTEMS (14)</b> 2.1 Concept of Discrete time signals. 2.1.1 Elementary Discrete time signals. 2.1.2 Classification Discrete time signal.
	4th	2.1.3 Simple manipulation of discrete time signal.
<b>4th</b>	1st	2.2 Discrete time system. 2.2.1 Input-output of system.
	2nd	2.2.2 Block diagram of discrete- time systems
	3rd	2.2.3 Classify discrete time system.
	4th	2.2.4 Inter connection of discrete -time system.
<b>5th</b>	1st	2.3 Discrete time time-invariant system. 2.3.1 Different techniques for the Analysis of linear system.
	2nd	2.3.2 Resolution of a discrete time signal in to impulse.
	3rd	2.3.3 Response of LTI system to arbitrary inputs using convolution sum.
	4th	2.3.4 Convolution & interconnection of LTI system - properties.
<b>6th</b>	1st	2.3.5 Study systems with finite duration and infinite duration impulse response.
	2nd	2.4 Discrete time system described by difference equation. 2.4.1 Recursive & non-recursive discrete time system.
	3rd	2.4.2 Determine the impulse response of linear time invariant recursive system.
	4th	2.4.3 Correlation of Discrete Time signals

7th		<b>3. THE Z-TRANSFORM &amp; ITS APPLICATION TO THE ANALYSIS OF LTI SYSTEM. (14)</b>
	1st	3.1 Z-transform & its application to LTI system.
	2nd	3.1.1 Direct Z-transform.
	3rd	3.1.2 Inverse Z-transform.
8th	4th	3.2 Various properties of Z-transform.
	1st	Continue
	2nd	3.3 Rational Z-transform.
	3rd	3.3.1 Poles & zeros.
9th	4th	3.3.2 Pole location time domain behaviour for casual signals.
	1st	3.3.3 System function of a linear time invariant system.
	2nd	3.4 Discuss inverse Z-transform.
	3rd	3.4.1 Inverse Z-transform by partial fraction expansion.
10th	4th	Continue
	1st	3.4.2 Inverse Z-transform by contour Integration
	2nd	Continue
	3rd	<b>4. DISCUSS FOURIER TRANSFORM: ITS APPLICATIONS PROPERTIES(12)</b>
11th	4th	4.1 Concept of discrete Fourier transform.
	1st	4.2 Frequency domain sampling and reconstruction of discrete time signals.
	2nd	4.3 Discrete Time Fourier transformation(DTFT)
	3rd	Continue
12th	4th	4.4 Discrete Fourier transformation (DFT).
	1st	Continue
	2nd	4.5 Compute DFT as a linear transformation.
	3rd	4.6 Relate DFT to other transforms.
13th	4th	4.7 Property of the DFT.
	1st	4.8 Multiplication of two DFT & circular convolution
	2nd	<b>5. FAST FOURIER TRANSFORM ALGORITHM &amp; DIGITAL FILTERS(10)</b>
	3rd	5.1 Compute DFT & FFT algorithm.
14th	4th	Continue
	1st	5.2 Direct computation of DFT.
	2nd	5.3 Divide and Conquer Approach to computation of DFT
	3rd	5.4 Radix-2 algorithm. (Small Problems)
15 <sup>th</sup> (Extra)	4th	5.5 Application of FFT algorithms
	1st	5.6 Introduction to digital filters.
	2nd	(FIR Filters)& General considerations
	3rd	5.7 Introduction to DSP architecture,
	4th	familiarization of different types of processor

**Soma Dash**  
Signature of the Faculty