ACADEMIC LESSION PLAN FOR SUMMER - 2025

Dept. of Electronics & Telecommunication, Govt. Polytechnic , Balasore

Name of the Faculty: Yogasakti Yogamaya (Lecturer Stage-II, E&TC)

Digital Signal Processing (TH-3)

Theory : 4 P/W
Total Period s : 60 P/ Sem
Examination : 3 Hours
Sem : 6th , E&TC

Internal Assessment : 20 Marks
End Semester Exam : 80marks
Total Marks : 100 Marks
Start of Class : 4TH Feb 2025

WEEK	PERIOD	TOPIC
1st	1st	**Introduction of Signals, Systems & Signal processing:** 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	Classify signals - Multi channel& Multi-dimensional signals Continuous time verses Discrete -times Signal. –Continuous valued verses Discrete -valued signals.
	4th	Concept of frequency in continuous time & discrete time signals Continuous-time sinusoidal signals.
2nd	1st	Discrete-time sinusoidal signals-Harmonically related complex exponential.
	2nd	Analog to Digital & Digital to Analog conversion.
	3rd	Sampling of Analog Signal, The sampling theorem.
	4th	Quantization of continuous amplitude signals, Coding of quantized sample.
3rd	1st	Digital to analog conversion
	2nd	Analysis of digital systems signals vs. discrete time signals systems.
	3rd	**DISCRETE TIME SIGNALS & SYSTEMS.** Concept of Discrete time signals. Elementary Discrete time signals.
	4th	Classification Discrete time signal
4th	1st	Classification Discrete time signal
	2nd	Simple manipulation of discrete time signal
	3rd	Discrete time system:Input-output of system
	4th	Block diagram of discrete- time systems
5th	1st	Classify discrete time system
	2nd	Classify discrete time system
	3rd	Inter connection of discrete -time system.
	4th	Discrete time time-invariant system: Different techniques for the Analysis of linear system
6th	1st	Resolution of a discrete time signal in to impulse. Response of LTI system to arbitrary inputs using convolution sum..
	2nd	Convolution & interconnection of LTI system –properties. Study systems with finite duration and infinite duration impulse response.
	3rd	Discrete time system described by difference equation.Recursive & non-recursive discrete time system.
	4th	Determine the impulse response of linear time

		invariant recursive system. Correlation of Discrete Time signals
7th	1st	**Z-transform & its application to LTI system.** Direct Z-transform.,Inverse Z-transform.
	2nd	Direct Z-transform
	3rd	Various properties of Z-transform
	4th	Various properties of Z-transform
8th	1st	Various properties of Z-transform
	2nd	Rational Z-transform:Poles & zeros. Pole location time domain behaviour for casual signals
	3rd	Pole location time domain behaviour for casual signals
	4th	System function of a linear time invariant system
9th	1st	System function of a linear time invariant system
	2nd	Discuss inverse Z-transform:Inverse Z-transform by partial fraction expansion.
	3rd	Inverse Z-transform by partial fraction expansion
	4th	Inverse Z-transform by partial fraction expansion
10th	1st	Inverse Z-transform by contour Integration
	2nd	Inverse Z-transform by contour Integration
	3rd	**DISCUSS FOURIER TRANSFORM: ITS APPLICATIONS ,PROPERTIES:** Concept of discrete Fourier transform
	4th	Frequency domain sampling and reconstruction of discrete time signals.
11th	1st	Frequency domain sampling and reconstruction of discrete time signals.
	2nd	Discrete Time Fourier transformation(DTFT)
	3rd	Discrete Fourier transformation (DFT).
	4th	Discrete Fourier transformation (DFT).
12th	1st	Compute DFT as a linear transformation
	2nd	Relate DFT to other transforms
	3rd	Property of the DFT
	4th	Property of the DFT
13th	1st	Multiplication of two DFT & circular convolution
	2nd	circular convolution
	3rd	**FAST FOURIER TRANSFORM ALGORITHM & DIGITAL FILTERS:**Compute DFT & FFT algorithm.
	4th	Direct computation of DFT. Divide and Conquer Approach to computation of DFT
14th	1st	Radix-2 algorithm.
	2nd	Radix-2 algorithm. (Small Problems)
	3rd	Radix-2 algorithm. (Small Problems)
	4th	Radix-2 algorithm. (Small Problems)
15th	1st	Application of FFT algorithms
	2nd	Introduction to digital filters.(FIR Filters)& General considerations
	3rd	Introduction to DSP architecture,
	4th	Familiarization of different types of processor

3/2/25

03/02/25