UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA

LESSON PLAN

SESSION: 2023-2024

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT CODE: Th.3
NAME OF THE SUBJECT: DIGITAL SIGNAL PROCESSING (DSP)
BRANCH: ELECTRONICS & TELECOMMUNICATION
SEMESTER: 6TH
NUMBER OF CLASSES ALLOTED PER WEEK : 4
TOTAL PERIODS ALLOTED TO THE SUBJECT ACCORDING TO SCTEVT: 60
NAME OF THE FACULTY: MANASI PRIYADARSHINI

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BRANCH:	**ELECTRONICS & TELECOMMUNICATION**
SEMESTER:	**DIPLOMA 6th SEM**
PERIODS PER WEEK:	**4 (16/01/2024 to 26/04/2024)**

Week/Date	Lecture	Topic to be covered
1st week	1st	Chapter-1: Basics of Signals, Systems & Signal processing- basicelement of a digital signal processing system.
	2nd	Advantages of digital signal processing over analog signal processing.
	3rd	Classification of signals - Multi channel& Multi-dimensionalsignal, Continuous time verses Discrete -times Signal, Continuousvalued verses Discrete -valued signals.
	4th	Deterministic signal, random signal , analog signal and digitalsignal
2nd week	1st	Concept of frequency in continuous time & discrete time signals-Continuous-time sinusoidal signals-Discrete-time sinusoidal signals-Harmonically related complex exponential
	2nd	Analog to Digital & Digital to Analog conversion &explanation of the following thefollowing. Sampling of Analog signal and The sampling theorem.
	3rd	Quantization of continuous amplitude signals and Coding ofquantized sample. Digital to analog conversion
	4th	Analysis of digital signals vs. discrete time signals

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3rd week	1st	**Chapter 2:** **DISCRETE TIME SIGNALS &SYSTEMS.** Concept of Discrete time signals. Elementary Discrete time signals.
	2nd	Classification Discrete time signal: energy and power signals and related problems
	3rd	Periodic and aperiodic signals, even and odd signals
	4th	Simple manipulation of discrete time signal: shifting, scaling and folding
4th week	1st	Discrete time system: Input-output of system. Block diagram ofdiscrete- time systems
	2nd	Classification of discrete time system: static vs. dynamic, causal vs. non causal system
	3rd	Linear vs. non linear system
	4th	Time variant vs.time invariant system,stable vs. unstable system, interconnection of discrete time system.

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5th week	1st	Different techniques for the Analysis oflinearsystem. Resolution of a discrete time signal into impulses.
	2nd	Problems related to convolution sum
	3rd	Response of LTI system to arbitrary inputsusingconvolution sum. Convolution & interconnection of LTIsystem -properties.
	4th	Study systems with finite duration andinfiniteduration impulse response.
6th week	1st	Discrete time system described by differenceequation. Recursive & non-recursive discrete time system
	2nd	Determine the impulse response of linear time invariant recursive system
	3rd	Correlation of Discrete Time signals
	4th	Chapter 3:**THE Z-TRANSFORM & ITS APPLICATION TO THE ANALYSIS OF LTISYSTEM.** Introduction to Z-transform & its application to LTIsystem.

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7th week	1st	Z transform of infinite duration signals
	2nd	Properties of ROC and some problems related to elementary signals
	3rd	Properties of z transform
	4th	Definition of poles and zeros of a rational function
8th week	1st	Pole location time domain behaviour for casualsignals. System function of a linear time invariantsystem
	2nd	Introduction to inverse z transform
	3rd	Inverse Z-transform by partial fraction expansion and long division method
	4th	continued
9th week	1st	Some problems related to partial fraction expansion
	2nd	continued
	3rd	Causality and stability test
	4th	continued

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10th week	1st	**Chapter-4:** **DISCUSS FOURIER TRANSFORM: ITS APPLICATIONs AND PROPERTIES** Concept of discrete Fourier transform , Frequency domain sampling and reconstruction of discrete timesignals.
	2nd	Discrete Time Fourier transformation(DTFT) Discrete Fourier transformation (DFT).
	3rd	Problems on DFT
	4th	Computation of DFT as a linear transformation
11th week	1st	IDFT and problems related to IDFT
	2nd	Relation of DFT to other transforms.
	3rd	Properties of the DFT.
	4th	Multiplication of two DFT & circular convolution

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12th week	1st	Problems related to circular convolution
	2nd	**Chapter-5:** **FAST FOURIER TRANSFORM ALGORITHM &DIGITAL FILTERS.** Computation of DFT & FFT algorithm.Direct computation of DFT.
	3rd	Divide and Conquer Approach tocomputation of DFT Radix-2 algorithm. (Small Problems)
	4th	DIT ALGORITHM
13th week	1st	Problems related to DIT ALGORITHM
	2nd	DIF ALGORITHM
	3rd	Problems related to DIF ALGORITHM
	4th	Application of FFT algorithms

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14th week	1st	Introduction to digital filters.(FIR Filters)&General considerations
	2nd	Introduction to DSP architecture, familiarisation of different typesof processor
	3rd	CHAPTERWISE short question discussion and previous year question discussion
	4th	continued
15th Week	1st	CHAPTERWISE long question discussionand previous year question discussion
	2nd	continued
	3rd	NA
	4th	NA