ACADEMIC LESSON PLAN OF SUMMER 2026

ACADEMIC LESSON PLAN OF SUMMER 2026		
Discipline: ETC	**Semester:6TH**	**Name of the Teaching Faculty: ABINASH MISHRA**
Subject: Th.3- DIGITAL SIGNAL PROCESSING	**No of Days/per week Classallotted:4**	**Semester From date: 22.12.2025 to 18.04.2026 No of Weeks:15**
Week	**Class Day**	**Theory Topics**
1st	1st	1.1 Basics of Signals, Systems & Signal processing- basic element of a digital signal processing system -Compare the advantages of digital signal processing over analog signal processing.
	2nd	1.1 Basics of Signals, Systems & Signal processing- basic element of a digital signal processing system -Compare the advantages of digital signal processing over analog signal processing.
	3rd	1.2 Classify signals - Multi channel& Multi-dimensional signalsContinuous time verses Discrete -times Signal. -Continuous valued verses Discrete -valued signals.
	4th	1.2 Classify signals - Multi channel& Multi-dimensional signalsContinuous time verses Discrete -times Signal. -Continuous valued verses Discrete -valued signals.
2nd	1st	1.3 Concept of frequency in continuous time & discrete time signalsContinuous-time sinusoidal signals-Discrete-time sinusoidal signals-Harmonically related complex exponential.
	2nd	1.3 Concept of frequency in continuous time & discrete time signalsContinuous-time sinusoidal signals-Discrete-time sinusoidal signals-Harmonically related complex exponential.
	3rd	1.4 Analog to Digital & Digital to Analog conversion & explain the following. a. Sampling of Analog signal, b. The sampling theorem.
	4th	c. Quantization of continuous amplitude signals,
3rd	1st	d. Coding of quantized sample. e. Digital to analog conversion.
	2nd	f. Analysis of digital systems signals vs. discrete time signals systems.
	3rd	2.1 Concept of Discrete time signals. 2.1.1 Elementary Discrete time signals. 2.1.2 Classification Discrete time signal. 2.1.3 Simple manipulation of discrete time signal.
	4th	2.1 Concept of Discrete time signals. 2.1.1 Elementary Discrete time signals. 2.1.2 Classification Discrete time signal. 2.1.3 Simple manipulation of discrete time signal.
4th	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.
5th	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
6th	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

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		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	1st	3 THE Z-TRANSFORM & ITS APPLICATION TO THE ANALYSIS OF LTI SYSTEM. 3.1 Z-transform & its application to LTI system.
	2nd	3 THE Z-TRANSFORM & ITS APPLICATION TO THE ANALYSIS OF LTI SYSTEM. 3.1 Z-transform & its application to LTI system.
	3rd	3.1.2 Inverse Z-transform.
	4th	3.3 Rational Z-transform. 3.3.1 Poles & zeros
8th	1st	3.3 Rational Z-transform. 3.3.1 Poles & zeros
	2nd	3.3.2 Pole location time domain behaviour for casual signals.
	3rd	3.3.2 Pole location time domain behaviour for casual signals.
	4th	3.3.3 System function of a linear time invariant system
	1st	3.3.3 System function of a linear time invariant system
	2nd	3.4 Discuss inverse Z-transform. 3.4.1 Inverse Z-transform by partial fraction expansion
9th	3rd	3.4 Discuss inverse Z-transform. 3.4.1 Inverse Z-transform by partial fraction expansion
	4th	3.4 Discuss inverse Z-transform. 3.4.1 Inverse Z-transform by partial fraction expansion
10th	1st	3.4.2 Inverse Z-transform by contour Integration
	2nd	3.4.2 Inverse Z-transform by contour Integration
	3rd	4 : DISCUSS FOURIER TRANSFORM: ITS APPLICATIONS PROPERTIES. 4.1 Concept of discrete Fourier transform.
	4th	4.2 Frequency domain sampling and reconstruction of discrete time signals
11th	1st	4.3 Discrete Time Fourier transformation(DTFT)
	2nd	4.4 Discrete Fourier transformation (DFT)
	3rd	4.5 Compute DFT as a linear transformation.
	4th	4.5 Compute DFT as a linear transformation.
12th	1st	4.6 Relate DFT to other transforms.
	2nd	4.6 Relate DFT to other transforms.
	3rd	4.7 Property of the DFT 4.7 Property of the DFT
	4th	4.7 Property of the DFT
13th	1st	4.8 Multiplication of two DFT & circular convolution
	2nd	4.8 Multiplication of two DFT & circular convolution

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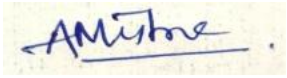
	3rd	5 FAST FOURIER TRANSFORM ALGORITHM & DIGITAL FILTERS. 5.1 Compute DFT & FFT algorithm
	4th	5.2 Direct computation of DFT.
14th	1st	5.3 Divide and Conquer Approach to computation of DF
	2nd	5.4 Radix-2 algorithm. (Small Problems)
	3rd	5.5 Application of FFT algorithms
	4th	5.5 Application of FFT algorithms
15th	1st	5.6 Introduction to digital filters.(FIR Filters)& General considerations
	2nd	5.6 Introduction to digital filters.(FIR Filters)& General considerations
	3rd	5.7 Introduction to DSP architecture, familiarisation of different types of processor
	4th	5.7 Introduction to DSP architecture, familiarisation of different types of processor



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Discipline: ETC	Semester: 4th	Name of the Teaching Faculty: **ABINASH MISHRA**
Subject: TH:1- ANALOG CIRCUITS	No. of days/per week class allotted:3p/week	Semester from: 22.12.2025 to 18.04.2026 No. of weeks:15 weeks
Week	**Class/week**	**Theory Topics**
1st	1st	DIODE CIRCUITs 1.1 Half Wave & Full Wave Rectifiers with Concept of Filter Circuit
	2nd	DIODE CIRCUITs 1.1 Half Wave & Full Wave Rectifiers with Concept of Filter Circuit
	3rd	1.2 Different type of Non-linear circuits - Clipper, diode series &shunt, positive& negative biased & unbiased and combinational clipper clippers circuit & its application.
2nd	1st	1.2 Different type of Non-linear circuits - Clipper, diode series &shunt, positive& negative biased & unbiased and combinational clipper clippers circuit & its application.
	2nd	1.3 Different type of Clamper circuit (positive & negative clampers) & its application.
	3rd	2.1 Amplifier models: 2.1.1 Voltage amplifier 2.1.2 Current amplifier 2.1.3 Trans-conductance amplifier 2.1.4 Trans-resistance amplifier
3rd	1st	2.2 Small signal analysis
	2nd	2.3 Low frequency transistor models
	3rd	2.4 Estimation of voltage gain, input resistance, output resistance
4th	1st	2.5 Design procedure for particular specifications
	2nd	2.6 Low frequency analysis of multistage amplifiers. 2.7 High frequency transistor models
	3rd	2.8 Frequency response of single stage and multistage amplifiers, cascade amplifier.
5th	1st	TUNED AMPLIFIER 3.1 Defined and classify Tuned amplifier
	2nd	3.2 Explain parallel Resonant circuit
	3rd	3.3 Resonance Curve& sharpness of Resonance.
6th	1st	3.4 Working principle of Single tuned Voltage & Double tuned Amplifier & its limitation
	2nd	3.4 Working principle of Single tuned Voltage & Double tuned Amplifier & its limitation
	3rd	OPERATIONAL AMPLIFIER 4.1 Differential amplifier & explain its configuration with significance
7th	1st	4.2 Op-Amp 4.2.1 Block diagram of Op-Amp 4.2.2 Symbol of Op-Amp
	2nd	4.2.3 Characteristics Op-Amp 4.2.4 Open loop and closed loop amplifier 4.2.5 Virtual ground concept
	3rd	4.2.6 IC-741 and its pin configuration 4.3 Op-Amp parameters 4.3.1 Input offset voltage 4.3.2 Output offset voltage
8th	1st	4.3.3 Input offset current 4.3.4 Input bias current 4.3.5 Common Mode

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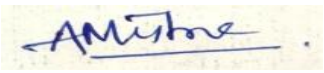
		Rejection Ratio
	2nd	4.3.6 Slew rate 4.3.7 Input and output Impedance 10 7 4.3.8 Bandwidth and gain bandwidth product 4.3.9 Drift parameters
	3rd	4.4 Discuss the types of integrated circuits, manufacturer's designations of ICs, Package types, pin identification and temperature and ordering information.
9th	1st	4.5 Draw and explain the Open Loop configuration (inverting, non-inverting Amplifier)
	2nd	4.6 Draw and explain the Closed loop configurations: inverting and non inverting
	3rd	4.6 Draw and explain the Closed loop configurations: inverting and non inverting
10th	1st	APPLICATION OF OPERATIONAL AMPLIFIER 5.1 Basic mathematical applications such as adder and subtractor
	2nd	5.2 Discuss the summing scaling using inverting and non-inverting amplifiers
	3rd	5.3 DC & AC Amplifies using OP-AMP. 5.4 Integrator and differentiator using op-amp.
11th	1st	5.5 Sample and Hold circuit 5.6 I-V converter and V-I converter
	2nd	5.7 Concept of Zero-Crossing Detector using Op-Amp (Inverting and Non Inverting type) 5.8 Comparator
	3rd	5.9 Schmitt Trigger 5.10 Peak Detector 5.11 Active filter using OP-AMP
12th	1st	5.12 Voltage to Frequency Convertor using Operational Amplifier. 5.13 Frequency to Voltage Conversion using Operational Amplifier.
	2nd	Integrated Circuit Timer 6.1 Internal block diagram and pin connection of a 555 timer chip
	3rd	6.2 Function of Output, Reset, Discharge, Control voltage, Trigger and Threshold terminals of a 555 timer
13th	1st	6.3 555 timer used as, A stable Multi-vibrator
	2nd	6.3 555 timer used as Mono stable Multi-vibrator
	3rd	6.3 555 timer used as Pulse width modulator and Pulse position modulator
14th	1st	Power Supply and Regulated Power Supply 7.1 Design a full wave bridge rectifier circuit by choosing the proper size of transformer, diode and capacitors
	2nd	7.2 Measure the percent regulation and percent ripple of dc power supply
	3rd	7.3 Design a bipolar unregulated power supply
15th	1st	7.4 Design a fixed dual voltage power supply using 7800 and 7900n series of IC three terminal regulator
	2nd	7.5 Design an adjustable dual voltage regulated power supply using LM317 chip
	3rd	7.5 Design an adjustable dual voltage regulated power supply using LM337 chip



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Discipline: ETC	Semester: 4th	Name of the Teaching Faculty: **ABINASH MISHRA**
Subject: TH:4(A)- DIGITAL SIGNAL PROCESSING	No. of days/per week class allotted:3p/week	Semester from: 22.12.2025 to 18.04.2026 No. of weeks:15 weeks
Week	**Class/week**	**Theory Topics**
1st	1st	Discrete Time Signals 1.1 Sequences
	2nd	1.2 Representation of signals on orthogonal basis
	3rd	1.3 Sampling and reconstruction of signals
2nd	1st	1.3 Sampling and reconstruction of signals
	2nd	1.4 Discrete systems attributes
	3rd	1.5 Z-Transform
3rd	1st	1.6 Analysis of LSI systems
	2nd	1.6 Analysis of LSI systems
	3rd	1.7 Frequency Analysis
4th	1st	1.8 Inverse Systems
	2nd	1.9 Discrete Fourier Transform(DFT)
	3rd	1.10 Fast Fourier Transform Algorithm
5th	1st	1.11 Implementation of Discrete Time Systems
	2nd	1.11 Implementation of Discrete Time Systems
	3rd	1.11 Implementation of Discrete Time Systems
6th	1st	Design of FIR Digital Filters 2.1 Window method
	2nd	Design of FIR Digital Filters 2.1 Window method
	3rd	2.2 Park-McClellan's method
7th	1st	2.2 Park-McClellan's method
	2nd	2.3 Design of IIR Digital Filters: 2.3.1 Butterworth, 2.3.2 Chebyshev
	3rd	2.3.3 Elliptic Approximations
8th	1st	2.4 Low pass filters
	2nd	2.4 Low pass filters
	3rd	2.5 Band pass filters
9th	1st	2.5 Band pass filters
	2nd	2.6 Band stop filters
	3rd	2.6 Band stop filters
10th	1st	2.7 High pass filters
	2nd	2.7 High pass filters
	3rd	2.7 High pass filters
11th	1st	Finite Register Length in FIR Filter Design 3.1 Effect of finite register length in FIR filter design
	2nd	Finite Register Length in FIR Filter Design 3.1 Effect of finite register length in FIR filter design
	3rd	Finite Register Length in FIR Filter Design 3.1 Effect of finite register

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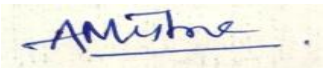
		length in FIR filter design
12th	1st	3.2 Parametric and non-parametric spectral estimation
	2nd	3.2 Parametric and non-parametric spectral estimation
	3rd	3.2 Parametric and non-parametric spectral estimation
13th	1st	3.3 Introduction to multi rate signal processing.
	2nd	3.3 Introduction to multi rate signal processing.
	3rd	Applications of DSP 4.1 Application of DSP to Speech signal processing.
14th	1st	Applications of DSP 4.1 Application of DSP to Speech signal processing.
	2nd	Applications of DSP 4.1 Application of DSP to Speech signal processing.
	3rd	Applications of DSP 4.1 Application of DSP to Speech signal processing.
15th	1st	4.2 Application of DSP to Radar signal processing.
	2nd	4.2 Application of DSP to Radar signal processing.
	3rd	4.2 Application of DSP to Radar signal processing.



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