**LESSON PLAN**

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| **Discipline:** ET & C. Engg. | **Semester:** Sixth (6th) | **Name of the Faculty:** Er K.M.Jena |
| **Subject:** Digital Signal Processing (Th-3) | **No. of days/week class allotted:** Six (6) | **Semester from Date: 16.01.24 to Date:26.04.24****No. of Weeks:** 15 |
| **WEEK** | **CLASS DAY** | **THEORY TOPICS** |
| 1st  | 1st  | Chapter No.- 01(Introduction of signals, systems & Signal processing)Basics of Signals, Systems & Signal processing. |
| 2nd  | Basic element of a digital signal processing system. Compare the advantages of digital signal processing over analog signal processing. |
| 3rd  | Classify signals-Multi channel & Multi- dimensional signals. |
| 4th  | Continuous time verses discrete time signals. Continuous valued verses discrete valued signals. |
| 5th | Concept of frequency in continuous time & discrete time signals. Continuous-time sinusoidal signals. |
| 6th | Discrete-time sinusoidal signals.Harmonically related complex exponential. |
| 2nd | 1st  | Analog to Digital & Digital to Analog conversion & explain the following. |
| 2nd  | a.Sampling of Analog signal.b.The sampling theorem. |
| 3rd  | c.Quantization of continuous amplitude signals.d.Coding of quantized sample. |
| 4th  | e. Digital to analog conversion.f. Analysis of digital systems signals vs. discrete time signals systems. |
| 5th | *Possible Question Answer Discussion* |
| 6th | CHAPTER-02(DISCRETE TIME SIGNALS & SYSTEMS)Introduction on Discrete time signals. |
| 3rd | 1st | Elementary discrete time signals. |
| 2nd | Classification of Discrete time signal. |
| 3rd  | Simple manipulation of discrete time signal. |
| 4th | Discrete time system.Input-output of system.Block diagram of discrete time system. |
| 5th | Classify discrete time system.Inter connection of discrete time system. |
| 6th | Discrete time time-invariant system. |
|  | 1st | Different technique for the analysis of linear system. |
| 2nd | Resolution of a discrete time signal in to impulse. |
| 4th | 3rd  | Response of LTI system to arbitrary inputs using convolution sum. |
| 4th  | Convolution & interconnection of LTI system- properties. |
|  | 5th | Study systems with finite duration and infinite duration impulse response. |
| 6th | Monthly Test-1 |
| 5th | 1st  | Discrete time system described by difference equation.Recursive & non-recursive discrete time system. |
| 2nd  | Determine the impulse response of linear time invariant recursive system.Correlation of Discrete Time signals. |
| 3rd  | *Possible Question Answer Discussion* |
| 4th  | CHAPTER-03(THE Z-TRANSFORM & ITS APPLICATION TO THE ANALYSIS OF LTI SYSTEM) Z-transform & its application to LTI system. |
| 5th | Direct Z-transform. |
| 6th | Inverse Z-transform. |
| 6th | 1st  | Various properties of Z-transform. |
| 2nd  | Various properties of Z-transform. |
| 3rd  | Rational Z-transform. |
| 4th  | poles & zeros. |
| 5th | Pole location time domain behavior for casual signals. |
| 6th | System function of a linear time invariant system. |
| 7th | 1st  | Discuss inverse Z-transform. |
| 2nd  | Discuss inverse Z-transform. |
| 3rd  | Inverse Z-transform by partial fraction expansion. |
| 4th  | Monthly Test-2 |
| 5th | Inverse Z-transform by contour Integration. |
| 6th | Inverse Z-transform by contour Integration. |
| 8th | 1st  | *Possible Question Answer Discussion* |
| 2nd  | CHAPTER-04(DISCUSS FOURIER TRANSFORM: ITS APPLICATIONS PROPERTIES)Concept of discrete Fourier transform |
| 3rd  | Frequency domain sampling and reconstruction of discrete time signals. |
| 4th  | Discrete Time Fourier transformation (DTFT). |
| 5th | Discrete Fourier transformation (DFT). |
| 6th | Compute DFT as a linear transformation. |
| 9th | 1st  | Relate DFT to other transforms. |
| 2nd  | Property of the DFT. |
| 3rd  | Property of the DFT. |
| 4th  | Monthly Test-3 |
| 5th | Property of the DFT. |
|  | 6th | Multiplication of two DFT & circular convolution. |
| 10th | 1st  | Multiplication of two DFT & circular convolution. |
| 2nd  | Multiplication of two DFT & circular convolution |
| 3rd  | *Possible Question Answer Discussion* |
| 4th  | CHAPTER-05 (FAST FOURIER TRANSFORM ALGORITHM & DIGITAL FILTERS)Compute DFT algorithm. |
| 5th | Direct computation of DFT. |
| 6th | Divide & Conquer approach to computation of DFT. |
| 11th | 1st  | Radix-2 algorithm. |
| 2nd  | Small Problems. |
| 3rd  | Application FFT algorithms. |
| 4th  | Introduction to digital filters. (FIR filter) & General consideration. |
| 5th | Introduction to DSP architecture |
| 6th | Familiarization of different Types of processors. |
| 12th | 1st  | Familiarization of different Types of processors. |
| 2nd  | *Possible Question Answer Discussion* |
| 3rd  | Monthly Test-4 |
| 4th  | Review Class for Chapter No.- 01 |
| 5th | Review Class for Chapter No.- 01 |
| 6th | Review Class for Chapter No.- 01 |
| 13th | 1st  | Review Class for Chapter No.- 01 |
| 2nd  | Review Class for Chapter No.- 01 |
| 3rd  | Review Class for Chapter No.- 02 |
| 4th  | Review Class for Chapter No.- 02 |
| 5th | Review Class for Chapter No.- 02 |
| 6th | Review Class for Chapter No.- 02 |
| 14th | 1st  | Review Class for Chapter No.- 02 |
| 2nd  | Review Class for Chapter No.- 03 |
| 3rd  | Review Class for Chapter No.- 03 |
| 4th  | Review Class for Chapter No.- 03 |
| 5th | Review Class for Chapter No.- 03 |
| 6th | Review Class for Chapter No.- 04 |
| 15th | 1st  | Review Class for Chapter No.- 04 |
| 2nd  | Review Class for Chapter No.- 04 |
| 3rd  | Review Class for Chapter No.- 04 |
| 4th  | Review Class for Chapter No.- 05 |
| 5th | Review Class for Chapter No.- 05 |
| 6th | Review Class for Chapter No.- 05 |

Coverage of Syllabus up to Internal Exam (I.A.)- Chapers-1,2,3&4.