

Nirma University
School of Technology, Institute of Technology
B. Tech (Electronics and Instrumentation Engineering)

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Course Code	2EIDE58
Course Title	Digital Signal Processing

Course Outcomes (CO):

At the end of the course, students will be able to –

- understand and analyze LTI systems in z-domain and frequency domain
- apply FFT algorithms
- design IIR and FIR digital filters and implement structures

Syllabus

**Teaching
Hours**

UNIT 1: Introduction to digital signal processing and its applications

02

Introduction to various signal processing algorithms and applications

UNIT 2: The Z-Transform and Analysis of LTI Systems

05

Pole and zeros, Pole location and time-domain behavior for causal signals, System function of LTI system, Analysis of LTI system in z – domain, One-sided z- transform

UNIT 3: Fast Fourier Transform Algorithms

07

FFT algorithms, Radix-2 FFT algorithm, Radix-4 FFT algorithm, Implementation of FFT algorithms, Applications of FFT algorithms, Quantization effects in the computation of DFT

UNIT 4: Implementation of Discrete Time Systems

06

Structures for FIR systems, Structures for IIR systems, Representation of numbers, Quantization of filter coefficients, Round-off effects in digital filters

Dr. A. K. J.

UNIT 5: Design of Digital Filters

10

Practical frequency selective filters, Design of linear-Phase FIR Filters using Windows, Frequency sampling method, Comparison of design methods, IIR filter design by Approximation of derivatives, Impulse invariance, Bilinear transformation, Characteristics of analog filters, Frequency transformation in analog and digital domain

Self Study:

The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

Laboratory Work:

Laboratory work will consist of minimum 10 experiments based on the above syllabus.

References:

1. John G. Proakis & Dimitrics G. Manolakis, Digital Signal Processing Principles, Algorithms and Applications, Pearson Publication.
2. Emmanuel C. Ifeachor & Barrie W. Jervis, Digital Signal Processing a practical approach, Pearson Publication.
3. Alan V. Oppenheim, Ronald W. Schafer & John R. Buck, Discrete-time Signal Processing, Pearson Publication.
4. B. Venkataramani & M. Bhaskar, Digital Signal Processors, Architecture, Programming and Applications, Tata McGraw Hill Publication.

D. S. J.