

S. No.	Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
								Sessional	Final Exam	Total
2	ECE-502	Digital Signal Processing	PCC	4	3	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to :	
CO1	Classify signals/systems and analyze linear time-invariant systems to solve problems in signal processing.
CO2	Comprehend the concept of the Z-transform for implementing the structures of discrete-time systems.
CO3	Implement frequency domain sampling and DFT for linear filtering applications.
CO4	Demonstrate proficiency in applying FIR filter design techniques in signal processing.
CO5	Gain expertise in designing IIR filters using methods for desired specifications.

Detailed Syllabus**Section A**

Unit 1: Representation/ Classification of Signals and Systems: Introduction, Classification of continuous time and discrete time signals, Classification of Systems, Properties of system. Discrete Time Signal Representation: Analysis of linear time invariant system, Properties of Linear time invariant systems. Recent developments in Digital Signal Processing.

(10 Hrs)

Unit 2: Discrete Transforms: Z-transform and its properties, Inversion of Z-transform, one-sided Z-transform, and solution of differential equations. Relationship between Z-transform and Fourier transform, applications of Z-transform. Implementation Structures of Discrete Time Systems: Direct form, cascade, and transposed form structures for FIR systems. Direct forms, transposed form, cascade, and parallel form structures for IIR systems.

(12 Hrs)

Unit 3: 3: Frequency Domain Sampling and DFT: DTFT, DFT, properties, Linear filtering using DFT, radix 2 FFT-Decimation in time FFT algorithms & decimation in frequency FFT algorithms.

(12 Hrs)**. Section B**

Unit 4: Design of FIR Filters: Characteristics of practical frequency selective filters, types of FIR filters, filter design specifications such as peak pass band ripple, minimum stop band attenuation etc. Design of FIR filters using windowing method, frequency sampling method.

(10 Hrs)

Unit 5: Design of IIR Filters: Design of IIR filters from analog filters, Impulse invariance method, bilinear Z transformation method, QMF filter, Butterworth filter and Chebyshev analog filters.

(10 Hrs)**Text Book**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
2	Digital Signal Processing	S. Salivahanan	McGraw Hill	4 th (2019)
3	Digital Signal Processing	A Anand Kumar	PHI	2 nd (2015)
1	Digital Signal Processing: Principle, Algorithms and Applications	John G Proakis, D G Manolakis	Pearson	5 th (2021)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Digital Signal Processing: A computer based approach	S. K. Mitra	McGraw Hill	4 th (2013)
3	Digital Signal Processing	Alan V. Oppenheim and Ronald W. Schaffer	Pearson	1 st (2015)