

AMRITA SCHOOL OF ENGINEERING,
Amrita Nagar, Coimbatore - 641112
Department of Electronics and Communication Engineering

Course Plan

Programme / Branch / Semester	:	B.Tech /CSE(Cyber Security) / II
Academic Year	:	2021-22
Course Code & Name	:	20CYS111 – Digital Signal Processing
Name of Mentor	:	Dr. J. Aravinth
Name(s) of Course Instructor(s)	:	Dr. J. Aravinth

Course Outcomes

CO 01	Able to understand the concepts of signals and systems.
CO 02	Able to analyze the frequency domain characteristics of discrete time signals and systems
CO 03	Able to comprehend realization structures for filters.
CO 04	Able to develop a digital signal processing system for different applications.

Survey questions for indirect attainment of Course Outcomes

CO 01	Able to understand the concepts of signals and systems?
CO 02	Able to analyze the frequency domain characteristics of discrete time signals and systems?
CO 03	Able to comprehend realization structures for filters?
CO 04	Able to develop a digital signal processing system for different applications?

Unit I

Topics	Basic signals: unit step, unit impulse, sinusoidal and complex exponential signals - Types of signals- Basic operations on signals - system properties -Time Domain characterization of continuous time and discrete time LTI system-Convolution Integral - Convolution sum-Analysis of LTI system described by differential and difference equations
Keywords	Signals, Systems, Properties, Convolution, Linear Time Invariant systems
Objectives	To provide basic idea on signals and systems and discuss few

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	relevant applications To understand the time domain concepts of LTI system through different representations
Course Outcomes Addressed	CO 01, CO 03, CO 04
Tutorials (No. & Topic)	3 – Operation on a signal, Properties of a system, Convolution Sum & Interconnection of LTI
Assignments (No. & Topic)	2 – Analysis of LTI systems, Convolution sum
Quiz (No. & Topic)	2- Basic signals & system properties
Remarks	
Unit II	
Topics	Discrete Fourier transforms: Fourier Transform, Fourier analysis of discrete time signals and systems: Discrete Time Fourier series – Discrete Time Fourier Transform - properties of DTFT – Introduction to DFT- properties of DFT – linear filtering methods based on DFT – FFT algorithms.
Keywords	DTFS, DTFT, DFT and FFT
Objectives	To understand the frequency domain concepts of signals
Course Outcomes Addressed	CO 02, CO 03, CO 04
Tutorials (No. & Topic)	3 –DTFS, DTFT, FFT
Assignments (No. & Topic)	2 – DFT & FFT
Quiz (No. & Topic)	2 – DFT & FFT
Remarks	
Unit III	
Topics	Digital filters: Introduction, specifications of practical filters, Characteristics of commonly used analog filters – IIR filters: design by approximation of derivatives – impulse invariance and bilinear transformation – Butterworth filter- frequency transformations for analog and digital filters, Structures for IIR systems. FIR filters: symmetric and anti-symmetric FIR filters – design of linear phase FIR filter using windows –Structures for FIR systems – direct form structures, Linear phase, and cascade form structures. Brief introduction to Wavelets and Wavelet transform
Keywords	FIR, IIR, Structures
Objectives	To Characterize analog and digital filter
Course Outcomes Addressed	CO 01, CO 03, CO 04
Tutorials (No. & Topic)	4 – Design of FIR & IIR filters

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Assignments (No. & Topic)	2 - Digital filter design and realization
Quiz (No. & Topic)	2 - Digital filter design and realization
Remarks	

Textbook	<ol style="list-style-type: none"> 1. Simon Haykin, Barry Van Veen, "Signals and Systems", Second Edition, John Wiley and Sons, 2007. 2. Alan V. Oppenheim, Alan S. Wilsky, S. Hamid Nawab, "Signals and Systems". Prentice Hall India private Limited, Second Edition, 1997.
References	<ol style="list-style-type: none"> 1. John G Proakis, G. Manolakis, Digital Signals Processing Principles, Algorithms, Applications, Prentice Hall India Private Limited, Fourth Edition, 2007. 2. Allen V. Oppenheim, Ronald W. Schafer, Discrete time Signal processing, Prentice Hall India Private Limited, Third Edition, 2013

Evaluation Pattern

Type	Evaluation Component	Count	Relevant COs	Weightage
Mid Term Exam	Online Exam	1	CO1,CO2,CO3,CO4	10
	Viva	1		20
Continuous Assessment	Tutorial	10	CO1,CO2,CO3,CO4	5
	Assignment	6	CO1,CO2,CO3,CO4	5
	Online Quiz	6	CO1,CO2,CO3,CO4	10
End Semester	Online Exam	1	CO1,CO2,CO3,CO4	20
	Viva	1		30
Total				100