No	Course Information (2019-2020)	
1	Unit name:	Digital Signal Processing I
2	Code:	EcE – 51005
3	Classification:	Engineering subject
4	Credit value:	3 (2-0-2)
5	Semester/ Year Offered:	1/5
6	Pre-requisite:	EcE – 21021 & 22021 Digital Electronics
7	Mode of delivery:	Lecture, Demonstration for Experiment
8	Assessment system and breakdown of marks:	Tutorial, Lab Report, Exam
	Assignment/Home work /Tutorial	10%
	Lab Report	20 %
	Q & A	70%
9	Academic staff teaching unit:	Department of Electronic Engineering
10	Course outcome of unit: After completion of this course, students will be able to 1. Recognize signal processing, configurations, applications, operations, advantages and disadvantages of digital system 2. Apply various theorems to determine Fourier Series, Fourier Transform, Z Transform, Transfer Functions, Convolution of the signals 3. Apply time-domain and frequency-domain signals, z transform, FFT, DTFT, Convolution, Filters using MATLAB to test the signal operations (LAB)	
11	Synopsis of unit: This course provides a systematic introduction to signal, signal processing and digital system. It emphasizes the time-domain, frequency-domain and signal filtering techniques. It also presents the theorem and properties of the z transform and convergence. Transfer Functions, Time-domain and Frequency-domain Analysis are also described in this course. In addition, it includes the process of Interrelation, Sampling, Aliasing, A/D & D/A Converter. This course describes the realization and implementation of digital filters.	

12	**Topic:** Chapter 1. Introduction to Digital Signal Processing 1.1 Introduction 1.2 Signals 1.3 Frequency-Domain Representation 1.4 Notation 1.5 Signal Processing 1.6 Analog Filters 1.7 Applications of Analog Filters 1.8 Digital Filters 1.9 Two DSP Applications Chapter 2. The Fourier Series and Fourier Transform 2.1 Introduction 2.2 Fourier Series 2.3 Fourier Transform Chapter 3. The z Transform 3.1 Introduction 3.2 Definition of z Transform 3.3 Convergence Properties 3.4 The z Transform as a Laurent Series 3.5 Inverse z Transform 3.6 Theorems and Properties 3.7 Elementary Discrete-Time Signals 3.8 z-Transform Inversion Techniques 3.9 Spectral Representation of Discrete-Time Signals Chapter 4. Discrete-Time Systems 4.1 Introduction 4.2 Basic System Properties 4.3 Characterization of Discrete-Time Systems 4.4 Discrete-Time System Networks 4.5 Introduction to Time-Domain Analysis 4.6 Convolution Summation 4.7 Stability 4.8 State-Space Representation
14	**Main reference:** 1. Digital Signal Processing : Signals, Systems, and Filters, Andreas Antonious, University of Vitoria, British Columbia, Canada 2. Digital Signal Processing : Principles, Algorithms and Applications, Third Edition, John G. Proakis , Dimitris G. Manolakis
15	Additional references: 1. Digital signal processing using MATLAB, Third Edition, Vinary K. Ingle, John G. Proakis, Northeastern University 2. DIGITAL SIGNAL PROCESSING USING MATLAB FOR STUDENTS AND RESEARCHERS, JOHN W. LEIS, University of Southern Queensland

Information on Practical (Digital Signal Processing)

Lab	Activity
1	**Topic**: **Generation of Basic Signals** **Objectives:** • To distinguish different signals • To write MATLAB code for signal generation • To apply MATLAB Software **Resources**: i. Computer with MATLAB Software
2	**Topic**: **Magnitude and Phase of Fourier Transform** **Objectives:** • To determine the Fourier transform of the non-periodic signal • To write MATLAB code for signal generation of Fourier transform, its magnitude and phase • To be familiar with MATLAB Software **Resources**: i. Computer with MATLAB Software
3	**Topic**: **Real and Imaginary Parts of Fourier Transform** **Objectives:** • To write MATLAB code for signal generation of the magnitude, phase, real and imaginary parts of the Fourier transform for the discrete-time signal • To distinguish the magnitude, phase, real and imaginary parts of the Fourier transform for the discrete-time signals • To be familiar with MATLAB Software **Resources**: i. Computer with MATLAB Software

4	**Topic**: **Sampling The Amplitude Modulated Discrete-Time Signal** **Objectives:** i. To write MATLAB code for signal generation of the modulating signal, carrier signal and amplitude modulated signal ii. To get the relation of theory and practical concepts iii. To be familiar with MATLAB Software **Resources**: i. Computer with MATLAB Software
5	**Topic**: **Convolution and Graphical Convolution** **Objectives:** i. To write MATLAB code for finding the convolution values ii. To generate the graphical convolution signals iii. To get the relation of theory and practical concepts **iv.** To be familiar with MATLAB Software **Resources**: i. Computer with MATLAB Software

Approved By

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