SIMULATION LABORATORY

III Semester: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AHS107	Core	-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 39				Total Classes: 39		

I. COURSE OVERVIEW:

This course integrates about the generation of both continuous and discrete time signals, basic operations, and frequency transformations of signals and systems. It covers the linear time invariant systems and their analysis in time and frequency domain. It can apply the concepts to obtain the correlation and convolution between signals and sequences, to find distribution and density functions of random variables. It provides the necessary background needed for understanding the signal processing and communications. This lab provides hands-on experience on implementation of communication systems using MATLAB software.

II. OBJECTIVES:

The course should enable the students to:

I The basic syntax of signals, generations and operations of signals and sequencesusing MATLAB.

II The spectral characteristics of signals using Fourier, laplace and z transform.

III The Implementation of convolution and correlation of signals and systems.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Realize** the tool basic operations addition, subtraction,multiplication and division on matrices	Apply
CO 2	**Generate** standard signals and sequences for performingoperations on various signals	Apply
CO 3	**Determine** Fourier transform, properties of Fourier transform andInverse Fourier transform of signal and sequence	Apply
CO 4	**Locate** the poles and zeros of transfer function using Laplace andZ transforms.	Apply
CO 5	**Determine** convolution and correlation between signals and sequences for analyzing linear time-invariant systems.	Apply
CO 6	**Compute** mean, mean square and power spectral density of signalto calculate gaussian noise.	Apply

IV. SYLLABUS:

LIST OF EXPERIMENTS

WEEK-1	**BASIC OPERATIONS ON MATRICES**
Review basic operations on matrices by using MATLAB	
WEEK-2	**GENERATIN OF VARIOUS SIGNALS AND SEQUENCE**
Generation of various signals and sequences such as unit impulse, sinc, Gaussian, exponential, saw tooth, triangular, sinusoidal by using MATLAB.	
WEEK-3	**OPERATION ON SIGNALS AND SEQUENCES**
Operation on signals and sequences such as addition, subtraction, multiplication, scaling, shifting, folding	

by using MATLAB.	
WEEK-4	**GIBBS PHENOMENON**
Verification of Gibbs phenomenon by using MATLAB	
WEEK-5	**FOURIER TRANSFORMS AND INVERSE FOURIER TRANSFORM**
Finding the Fourier Transform and inverse Fourier transform of a given signal/sequence and plotting its magnitude and phase spectrum by using MATLAB.	
WEEK-6	**PROPERTIES OF FOURIER TRANSFORMS**
Verifying Time shifting and scaling, time and differentiation properties of Fourier transforms by using MATLAB.	
WEEK-7	**LAPLACE TRANSFORMS**
Finding the Laplace transform of a given signal and locate its zeros and poles in s-plane.	
WEEK-8	**Z-TRANSFORMS**
Finding the z - transform of a given sequence and locate its zeros and poles in z-plane.	
WEEK-9	**CONVOLUTION BETWEEN SIGNALS AND SEQUENCES**
Finding convolution between two signals /sequences by using MATLAB.	
WEEK-10	**AUTO CORRELATION AND CROSS CORRELATION**
Finding auto correlation and cross correlation between signals and sequences by using MATLAB.	
WEEK-11	**GAUSS IAN NOISE**
Generation of Gaussian noise, computation of its mean, M.S. value and its Skew, kurtosis, and PSD, probability distribution function by using MATLAB.	
WEEK-12	**WIENER – KHINCHINE RELATIONS**
Verification of wiener – Khinchine relations using MATLAB.	
WEEK-13	**DISTRIBUTION AND DENSITY FUNCTIONS OF STANDARD RANDOM VARIABLES**
Finding distribution and density functions of standard random variables and plot them by using MATLAB	
WEEK-14	**WIDE SENSE STATIONARY RANDOM PROCESS**
Checking a random process for stationary in wide sense by using MATLAB.	

Reference Books:

1. S. Varadarajan , M. M. Prasada Reddy , M. Jithendra Reddy , "Signals and systems introduces MATLAB programs", I K International Publishing House Pvt. Ltd, 2016.
2. Scott L. Miller, Donald G. Childers, "Probability and Random Processes: With Applications to Signal Processing and communications", Elsevier, 2004.
3. Krister Ahlersten, "An Introduction to Matlab", BookBoon, 2012.
4. K. S. Suresh Kumar, "Electric Circuit Analysis", Pearson Education, 1st Edition, 2013.

Web References:

1. http://in.mathworks.com/help/matlab
2. http://web.mit.edu/acmath/matlab/course16/16.62x/16.62x_Matlab.pdf
3. https://www.probabilitycourse.com/chapter12/Chapter_12.pdf
4. http://www.iare.ac.in

Course Home Page:

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS

HARDWARE: Desktop Computer Systems 36 nos

SOFTWARE: MATLAB