

SIMULATION LABORATORY

III Semester: ECE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AHS107	Core	L	T	P	C	CIA	SEE	Total
		-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45			Total Classes: 45			
<p style="color: blue;">OBJECTIVES:</p> <p>The course should enable the students to:</p> <p>I. Analyze the generation Various Signals and Sequences in MATLAB, including the operations on Signals and Sequences.</p> <p>II. Compute convolution and correlation of various signals.</p> <p>III. Analyze the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.</p> <p style="color: blue;">COURSE LEARNING OUTCOMES (CLOs):</p> <p>The students should enable to:</p> <ol style="list-style-type: none"> 1. Understand Basics of MATLAB syntax, functions and programming 2. Analyze the generation Various Signals and Sequences in MATLAB. 3. Perform various operations on the signals including Time shifting, Scaling, Reversal, Amplitude Scaling. 4. Compute the Fourier Transform of a given signal and plotting its magnitude and phase spectrum. 5. Determine the Convolution between Signals and sequences. 6. Determine the Correlation between Signals and sequences. 7. Verification of Weiner-Khinchine Relations i.e Auto Correlation and Power Spectral Density forms Fourier transform pair. 8. Verification of time shifting and time reversal properties of Fourier Transform. 9. Remember for Locating the Zeros and Poles and plotting the Pole-Zero maps Z-Plane for the given transfer function. 10. Draw Distribution and density functions of standard random variables. 11. Verify Gibbs Phenomenon and understand the concept of fourier series of a signal. 12. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew. 13. Analyze and synthesize different signals for a wide application range. 								
LIST OF EXPERIMENTS								
WEEK -1	BASIC OPERATIONS ON MATRICES.							
To generate matrix and perform basic operation on matrices Using MATLAB Software.								
WEEK-2	GENERATION OF VARIOUS SIGNALS AND SEQUENCES							
Generation of Various Signals and Sequences (Periodic and a periodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.								
WEEK-3	OPERATIONS ON SIGNALS AND SEQUENCES SUCH AS ADDITION, MULTIPLICATION, SCALING, SHIFTING, FOLDING, COMPUTATION OF							

	ENERGY AND AVERAGE POWER
To performs functions on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.	
WEEK -4	DEMONSTRATION OF GIBB'S PHENOMENON
To verify the Gibbs Phenomenon	
WEEK -5	FINDING THE FOURIER TRANSFORM OF GIVEN SIGNAL AND PLOTTING ITS MAGNITUDE AND PHASE SPECTRUM.
To find the Fourier Transform of a given signal and plotting its magnitude and phase spectrum	
WEEK -6	PROPERTIES OF FOURIER TRANSFORMS
To verify the properties of DTFT of a given signal	
WEEK -7	LOCATING POLES AND ZEROS, AND PLOTTING THE POLE ZERO MAPS IN Z-PLANE FOR A GIVEN TRANSFER FUNCTION
To locating the zeros and poles and plotting the pole zero maps in Zplane for the given transfer function	
WEEK -8	CONVOLUTION BETWEEN SIGNALS AND SEQUENCES.
To find the output with linear convolution operation Using MATLAB Software.	
WEEK-9	AUTO CORRELATION AND CROSS CORRELATION BETWEEN SIGNALS AND SEQUENCES
To compute auto correlation and cross correlation between signals and sequences.	
WEEK-10	GENERATION OF GAUSSIAN NOISE(REAL & COMPLEX), COMPUTATION OF ITS MEAN, MEAN SQUARE VALUES AND ITS SKEW.
To Verify the Gaussian noise.	
WEEK-11	VERIFICATION OF WIENER-KHINCHIN RELATIONS
Verification of wiener–khinchine relation.	
WEEK-12	DISTRIBUTION AND DENSITY FUNCTIONS OF STANDARD RANDOM VARIABLES.
To calculate PDF and CDF of standard random variables	
WEEK-13	LAPLACE TRANSFORMS
Finding the Laplace transform of a given signal and locate its zeros and poles in s-plane.	
WEEK-14	WIDE SENSE STATIONARY RANDOM PROCESS

Checking a random process for stationary in wide sense by using MATLAB.

Text 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 Application to Signal Processing and communications”, Elsevier, 2004.

Reference Books:

1. Krister Ahlersten, “An Introduction to Mat lab”, Book Boon, 2012.
2. 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

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 24 STUDENTS:

HARDWARE: Desktop Computer Systems 36 no's

SOFTWARE: MATLAB R2015a