



INSTITUTE OF AERONAUTICAL ENGINEERING

Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE DESCRIPTION

Course Title	BASIC SIMULATION LAB			
Course Code	A30481			
Academic Year	2015 – 2016			
Course Structure	Lectures	Tutorials	Practical	Credits
	-	-	3	2
Course Coordinator	Mrs. L Shruthi, Assistant Professor, ECE			
Team Instructors	Mr. N Nagaraju, Assistant Professor, ECE			
Branch	II-I - B. Tech (Electronics and Communication Engineering)			

I. COURSE OBJECTIVES

This laboratory course builds on the lecture course "Signals and systems" which is mandatory for all students of electronics and communication engineering. The course aims at practical experience with the generation and simulation of basic signals, using standardized environments such as MATLAB. Experiments cover fundamental concepts of basic operation on matrices, generation of various signals and sequences, operation on signals and sequences, convolution, autocorrelation and cross correlation between signals and sequences. The objective of this laboratory is to enable the students to acknowledge with basic signals, and system responses. They can critically analyze the behavior of their implementation, and observe the specific limitations inherent to the computational platform like MATLAB.

II. MARKS DISTRIBUTION

SESSIONAL MARKS	UNIVERSITY END EXAM MARKS	TOTAL MARKS
For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. the end examination shall be conducted with external examiner and laboratory teacher.	50	75

III. OBJECTIVE

At the end the students will be able to:

To gain the practical hand-on experience of various signal processing tools and techniques using MTALAB

IV. OUTCOMES:

1. **Understand** Basics of MATLAB syntax, functions and programming.
2. **Analyze** the generation Various Signals and Sequences in MATLAB, including the operations on Signals and Sequences.
3. **Determine** the Convolution and Correlation between Signals and sequences.
4. **Verification** of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
5. **Analyze** the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
6. **Understand** the Waveform Synthesis using Laplace Transform.
7. **Remember** for Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
8. **Verification** of Weiner-Khinchine Relations and Sampling Theorem.

V. LIST OF EXPERIMENTS

Week	Program Category	List of Programs
1	Basic Operations	Basic Operations on Matrices.
2	Signal generation	Generation of Various Signals and Sequences (Periodic and aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3	Operations on Signals and Sequences	Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4	Operation	Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5	Convolution	Convolution between Signals and sequences.
6	Correlation	Auto Correlation and Cross Correlation between Signals and Sequences.
7	Verification	Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8	Computation and verification	Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9	Verification	Gibbs Phenomenon
10	Fourier Transform	Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11	Synthesis	Waveform Synthesis using Laplace Transform.
12	Locate and plot	Locating the Zeros and Poles and plotting the Pole-Zero

Week	Program Category	List of Programs
		maps in S-plane and Z-Plane for the given transfer function.
13	Generation and Computation	Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14	Discrete time signal generation	Sampling Theorem Verification.
15	Removal of noise	Removal of noise by Autocorrelation / Cross correlation.
16	Extraction	Extraction of Periodic Signal masked by noise using Correlation
17	Verification	Verification of Weiner-Khinchine Relations.
18	Verification	Checking a Random Process for Stationary in Wide sense.

Prepared B : Mrs. L Shruthi, Assistant Professor, ECE

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