CSE 301L: Signals and Systems Lab

Credit Hours: 1

Contact Hours: 3

Grading: As per UET Statutes

1. Course Outline

This course introduces students with the fundamentals of continuous and discrete time signals and systems. The course covers mathematical representations of signals and systems, classification of signals and systems, basic signal manipulations, properties of systems (such as linearity, time invariance, etc), time-domain analysis of signals and LTI systems (convolution sum and integral, and solution of differential and difference solutions), Fourier series representation, Fourier transform and its properties. The course also covers the basic concepts of implementation of continuous and discrete time systems. The course is supplemented by a lab course where the analytical and design skills of the students are enhanced through the use of Matlab and Simulink.
These tools form the basis of signal processing and are widely used in the design and analysis of various communication strategies. Hence their understanding provides students with the necessary background for tackling future courses such as digital signal processing, control system, communication systems, data communications & networks, digital system design, and digital image processing.

2. Weekly Plan

Lab	Experiments
Lab 01	Getting Started with MATLAB
Lab 02	Introduction to Matrices
Lab 03	Programming in MATLAB
Lab 04	Introduction to Graphics
Lab 05	Exponential Signals
Lab 06	Sinusoidal Signals
Lab 07	Basic Signal Operations
Lab 08	Convolution and LTI systems
Lab 09	Introduction to Fourier Series
Lab 10	Fourier Series of Continuous-Time Signals
Lab 11	Properties of Continuous-Time Fourier Series
Lab 12	Fourier Series of Discrete-time signals and its properties
Lab 13	Continuous-time Fourier Transform and its properties
Lab 14	Discrete-time Fourier Transform and its Properties
Lab 15	Filtering Signals and Frequency Response of Systems [OEL]
Lab 16	Introduction to Simulink [OEL]

3. CLOs and its Mapping with PLOs

CLO #	CLO	Domain	PLOs
CLO-1	Hands on experience of programming in MATLAB environment and perform basic variable arithmetic and matrix operations, use of built-in functions and programming control, relational, logical, branching and looping constructs.	P3 (Guided Response)	PLO 5(Modern Tool Usage)
CLO-2	Generate discrete and continuous time signals, apply transforms, analyze Linear Time Invariant systems, frequency response and filtering noisy signals.	C4 (Analysis)	PLO 2 (Problem Analysis)
CLO-3	Application of signals and systems techniques to real world problems such as signal denoising, speech processing and recognition in the form of project groups.	C5 (Synthesis)	PLO 3 (Design/ Development of Solutions)

4. CLOs Assessment Mechanism

Assessment Tools	CLO1	CLO2	CLO3
Lab Reports	20%	20%	
Lab Performance	20%	20%	
Mid Term	30%		
Final Term		30%	
Viva/ OEL	20%	20%	20%
Semester Project	10%	10%	80%

5. Resources

- Signals and Systems, Alan V. Oppenheim and Alan S. Willsky
- Signals and Systems Lab Manual
- MathWorks Tutorial: Getting Started with MATLAB

6. Grading Criteria

- **Lab Reports & Lab Performance 30%**
- **Midterm Lab Exam 10%**
- **Final Term Lab Exam 20%**
- **Project 15%**
- **Viva 25%**