

210 CNE Course Syllabus

Course Code	210CNE
Course Name	Signals and Systems
Credit Hours	3
Contact Hours	4
Instructor Name	Dr. Attaullah Khawaja

Text Book (title, author, and year)	
<ul style="list-style-type: none"> • Signals and Systems , Prentice hall, 2nd edition, Oppenheim • Signals and Systems, William H Tranter D R Fannin Rodger E Ziemer_ 	

Specific Course Information	
Catalog Description	This course gives basics of signals, their types, some important signals, signal operations and convolution. Basics of Fourier Series, Fourier Transform, and Laplace transform and some of their properties and applications are given. Finally the Systems, their properties and types are introduced.
Prerequisites	MATH 319
Co-requisites	NIL
Required/Elective	required

Course Learning Outcomes	
1	To outline the mathematical skills needed for solving problems involving convolution, scaling, shifting, and modulation.
2	To describe the fundamental characteristics of signals and systems and outline their general properties.
3	To characterize analytically and graphically continuous-time signals and explain the basic magnitude and time handling methods.
4	To explain time and frequency domain representation of linear signals and systems and to analyze a continuous-time signal using the standard FS, FT, and Laplace Transform.
5	To show basic use of simulation tools such as Matlab for analysing signals and systems.
6	To develop the student's appreciation of and respect for values and attitudes regarding carry out directed private study using textbooks, and other provided resources
7	To demonstrate the ability to communicate effectively through written assignments.

Course LOs #	Student Learning Outcomes											
	a1	a2	b1	b2	b3	b4	b5	c1	c2	c3	d1	d2
1	√											
2			√									
3			√									
4			√									
5							√					
6									√			
7											√	

List of Theory Topics

Introduction to Signals: Continuous and Discrete Time Signals, periodic signals, even and odd signals, some important signals, sinusoidal signals, unit step signal, unit impulse signal, real and complex exponentials.

, unit Impulse response of Signals

Signal operations and convolution: Amplitude scaling, shifting and inversion, time scaling, shifting and inversion, convolution of continuous-time signals.

Fourier theory: Trigonometric Fourier Series representation for periodic signals, Fourier Transform for Continuous-time Signals, Some properties of Fourier Transform, Some applications of Fourier series and Fourier Transform for electrical circuit analysis.

Introduction to Laplace Transform: Some properties of Laplace Transform, Some applications of Laplace Transform for electrical circuit analysis.

Systems: Systems properties, Memoryless and Memory Systems, Causal & Non-causal, Linear system, Stable Systems, Linear Time –Invariant systems.

List of Lab Experiments

1. Introduction to MATLAB.
2. Basics of signal plotting using PLOT & STEM commands.
3. Generation of Unit Impulse Signal, Unit Step Signal, and Unit Ramp Signal.
4. Generation of exponential Signal, continuous Sine wave and continuous Cosine wave, and square wave.
5. Different operation on signals (Addition, multiplication, Shifting, Scaling)
6. Implementing continuous-time convolution.
7. Finding Fourier series for a periodic signal.
8. Finding Fourier transform for some aperiodic signals.
9. Finding Laplace transform for some signals