

Course Number and Title:	EE- 311 Signals and Systems		
Credit Hours:	3+1		
Pre Requisite	None		
Instructor (s):	Dr. Inam ul Hasan Shaikh/ Engr. Faisal Siddiq		
Lab Engineer:	Engr. Tanveer Khursheed/ Engr. Farzana Kausar		
Compulsory/Elective:	Compulsory		
If Elective: Depth Core/ Breadth Core:			
Course Schedule:	Lecture:	3 hours/week	
	Lab:	3 hours/week	
	Office hours:	4 hours/week	
Course Assessment:	Assignments:	4	
	Quizzes:	4	
	Course project:		
	Lab work:	14 experiments	
	Exams:	Mid-semester and Final	
Grading Policy:	Quizzes:	10%	
	Assignments:	10%	
	Lab work:	20%	
	Mid-Semester:	20%	
	End-Semester:	40%	
Text Book:	Signals and Systems (2nd Edition), by Oppenheim, Willsky and Nawab		
Reference Book(s):	1) Signals & Systems by S. Haykins 2) Signals, Systems & Transform by Phillips & Parr 3) Continuous and Discrete Time Signals and Systems by Mandal		
Course Objective:	To provide understanding of signals, systems and transforms.		
Course Learning Outcome	CLO Statement	PLO	Bloom
CLO-1:	Knowledge about the fundamentals of continuous time and discrete time signals and systems both in time and frequency domains.	PLO-1	C1 C2
CLO-2:	Use linear systems tools, especially transform analysis and convolution, to analyze and predict the behavior of linear systems	PLO-2	C3
CLO-3:	Gain an appreciation for the importance of linear systems analysis in analog filter designing, communications, feedback control systems.	PLO-3	C4
Topics covered in the course and level of coverage:	❖ Continuous time and discrete time signals, periodic signals, even and odd signals, exponential and sinusoidal signals, the unit impulse and unit step functions	6 hours	
	❖ Continuous time and discrete time systems and their properties	6 hours	
	❖ Linear time invariant (LTI) systems and their properties, convolution sum and integral, difference equation	6 hours	
	❖ Continuous time Fourier series and its properties	6 hours	
	❖ Continuous time Fourier transform and its properties	6 hours	
	❖ Discrete time Fourier series and its properties	3 hours	
	❖ Discrete time Fourier transform and its properties	3 hours	
❖ Laplace transform and its properties	3 hours		

	❖ z-transform and its properties	3 hours										
	❖ Applications of signals and systems a) Analog filter designing, b) Modulation and its applications, c) Sampling, Quantization and Encoding, d) Feedback control systems	6 hours										
Program learning outcomes and how they are covered by specific course outcomes:	Detailed Contents	CLO	PLO									
	❖ Continuous time and discrete time signals, periodic signals, even and odd signals, exponential and sinusoidal signals, the unit impulse and unit step functions	CLO-1	PLO-1									
	❖ Continuous time and discrete time systems and their properties	CLO-1	PLO-1									
	❖ Linear time invariant (LTI) systems and their properties, convolution sum and integral, difference equation	CLO-1	PLO-1									
	❖ Continuous time Fourier series and its properties	CLO-2	PLO-2									
	❖ Continuous time Fourier transform and its properties	CLO-2	PLO-2									
	❖ Discrete time Fourier series and its properties	CLO-2	PLO-2									
	❖ Discrete time Fourier transform and its properties	CLO-2	PLO-2									
	❖ Laplace transform and its properties	CLO-2	PLO-2									
	❖ z-transform and its properties	CLO-2	PLO-2									
	❖ Applications of signals and systems a) Analog filter designing, b) Modulation and its applications, c) Sampling, Quantization and Encoding, d) Feedback control systems	CLO-3	PLO-3									
Mapping of CLOs with PLOs and Bloom's Taxonomy Cognitive Levels:												
PLO	1	2	3	4	5	6	7	8	9	10	11	12
CLO-1	C1 C2											
CLO-2		C3										
CLO-3			C4									
Mapping of CLOs with Assessment Methods:												
CLOs/Assessment	CLO-1			CLO-2				CLO-3				
Assignments:	√			√				√				
Quizzes:	√			√				√				
Lab work:	√			√				√				
Mid-Semester:	√											
End-Semester:				√				√				