Course Code	ECE 250
Course Name	Signals and Systems
Credits	4
Course Offered to	UG
Course Description	This course introduces the concepts of continuous and discrete time signal representation, Linear Time Invariant Systems (LTI), Fourier series representation of periodic signals, continuous and discrete time Fourier transform, Laplace and Z-transforms and their application.

Pre-requisites	
(Mandatory)	Pre-requisite (Desirable)
MTH100 Maths I	MTH100 Maths I
*Please insert more rows if required	

Post Conditions				
CO1	**CO2**	**CO3**	**CO4**	**CO5**
Students are able to classify basic signal representation; continuous time and discrete-time signals	Students are able to determine the response of an LTI system to continuous-time or discrete-time input signals.	Students are able to represent both continuous-time and discrete-time periodic signals as Fourier series.	Students are able to analyze continuous-time signals and systems using Fourier transform and Laplace transform.	Students are able to analyze discrete-time signals and systems using discrete-time Fourier transform and Z-transform.

Weekly Lecture Plan			
Week Number	**Lecture Topic**	**COs Met**	**Assignment/Labs/Tutorial**
Week 1	Introduction: Signals - discrete and continuous time, basic representation; Classification of signals – Continuous/discrete; deterministic/random; even/odd, power, energy, periodic/aperiodic functions.	CO1	Assignment#1: Theory and Matlab based on the topi

Week 2 and 3	System properties – Linearity (L), time-invariance (TI), causality, memory, stability; Impulse response of LTI system, Convolution (continuous and discrete time)	CO1, CO2	Assignment#2: Theory and Matlab based on the topi
Week 4 and 5	Fourier series- for continuous time and discrete-time signal representation; properties of Fourier series; system transfer function and frequency domain analysis	CO1, CO2, CO3	Assignment#3: Theory and Matlab based on the topi
Week 6 and 7	Continuous Time Fourier transform (FT); properties; system transfer function; analysis using FT	CO1, CO2, CO4	Assignment#4: Theory and Matlab based on the topi
Week 8 and 9	Sampling and signal reconstruction	CO1, CO2, CO3, CO4	Assignment#5: Theory and Matlab based on the topi
Week 9 and 10	Discrete Time Fourier Transform (DTFT) ; properties; system transfer function; analysis using DTFT	CO1, CO2, CO4	Quiz#5
Week 11 and 12	Laplace Transform, ROC; Properties of Laplace transform; Poles and zeros; Solution of differential equation using unilateral Laplace transform	CO1, CO2, CO4	Assignment#6: Theory and Matlab based on the topi
Week 13	Z-transform; ROC; Properties of Z-transform; Poles and zeros; System analysis	CO1, CO2, CO5	Assignment#7: Theory and Matlab based on the topi
Weekly Lab Plan- Not required explicitly; Matlab based exercises will be covered via assignments			
Week Number	**Laboratory Exercise**	**COs Met**	**Platform (Hardware/Software)**

*Please insert more rows if required				
Assessment Plan				
Type of Evaluation	**% Contribution in Grade**			
Attendance	10			
Quiz	15			
Assignment	10			
Project	15			
Mid-sem	20			
End-sem	30			
Resource Material				
Type	**Title**			
Textbook	Signals and Systems, 2nd Ed. by Alan V Oppenheim, Alan S Willsky and S. H. Nawab			
Reference				