Course Title: Signals and Systems
Course Code: EEEG 313
Credit Hours: 3

Course Description:
This course intends to make student understand the properties of continuous and discrete time systems and signals used in all branches of electrical engineering.

Course Contents:

Unit 1: Introduction
Signal classification, Use of signals, Examples of signals, Continuous and discrete time signals and systems

Unit 2: Linear Time-Invariant (LTI) Systems
Signal representation, Use of pulses; Discrete-time LTI-systems: the convolution sum; Continuous-time LTI-systems: the convolution integral; Properties of LTI-systems

Unit 3: Fourier Series and Transform
Fourier series: representation of periodic signals and properties; Fourier integral: Representation of aperiodic and periodic signals; Forward and reverse/inverse Fourier transforms; Fourier transform properties

Unit 4: Fourier analysis for Discrete Time Signals and Systems
Discrete time Fourier series: Representation of periodic signals and properties; Discrete time Fourier transform (DTFT): Representation of aperiodic signals; Forward and inverse/reverse DTFT; Properties of DTFT

Unit 5: Signal Transmission
Filtering: frequency selective and frequency shaping; Modulation

Unit 6: Noise, Energy and Power
White and colored noise, Stochastic signals, Finite energy and finite power signals, Parseval's theorems, signal to noise ratio.

Unit 7: Sampling of Continuous Signals
Sampling and aliasing, the sampling theorem, Conversion to discrete time signals, Reconstruction and zero-order hold compensation.

Unit 8: Discrete Time Signals and Systems
Discrete time systems and difference equations; Z-transform: convergence, Properties, Finite impulse response (FIR) and infinite impulse response (IIR) filters, Correlation: Cross correlation and auto correlation.

References:
1. Alexander D. Poularikas, Samuel Seely, *Signals and Systems,* 2nd Ed., PWS- Kent Publishers 1991
2. Alan V. *Oppenheim*, Alan S. Willsky With S. Hamid Nawab, *Signals and Systems*, PHI 1995
3. Chi Tsong Chen, *System and Signal Analysis,* Saunders College Publishing
4. Dimitris Manolakis and John G Proakis, *Digital Signal Processing,* 2nd Ed., PHI 1995