EECS 361- Spring 2026
Test 1 Topics

1) Complex numbers
2) Classification of signals
   a) Periodic
   b) Aperiodic
   c) Energy
   d) Power
   e) Continuous time
   f) Discrete time
   g) Deterministic
   h) Random
3) Time scaling, $x(at)$, and time shifting $x(t +/- T)$ signals
4) Phasor representation of $\cos(2\pi f_o t)$
5) Spectral plots for $A\cos(\omega_0 t+\phi)$ or $A\cos(2\pi f_o t+\phi)$ and $\Sigma\ A_n\cos(2\pi n f_o t+\phi_n) = \Sigma\ A_n\cos(n\omega_o t+\phi_n)$
6) Calculation of Energy and Power and classification of Energy and Power Signals
7) Power in $A\cos(\omega_0 t+\phi)$ or $A\cos(2\pi f_o t+\phi)$
8) Special functions
   a) $\delta(t)$
   b) tri(t)
   c) u(t)
   d) rect(t)
   e) r(t)
9) Classification of Systems
   a) Dynamic (with memory)/ Static (memory-less)
   b) Linear/Nonlinear
   c) Time Varying/Time invariant
   d) Causal/Noncausal
   e) Continuous time/ Discrete time
   f) BIBO stable
   g) Linear and Time Invariant (LTI) System
10) Convolution & its properties in continuous time
11) Impulse response h(t)
12) Step response $y_{Step}(t)$
13) Impulse response of cascaded linear time invariant systems
14) Bounded input/Bounded output (BIBO) stability and the impulse response - h(t)
15) Causality and the impulse response - h(t)
16) Transfer Function of linear time invariant systems – $H(\omega)$ or $H(f)$
17) Response of a linear time invariant systems with Transfer Function $H(\omega)$ or $H(f)$ to an input signal of $A\cos(\omega_0 t+\phi)$ or $A\cos(2\pi f_o t+\phi)$ or $\Sigma\ A_n\cos(n\omega_o t+\phi_n)$

18) Model periodic signals using Fourier Series

a) Complex exponential form, $\mathbf{x}_n$'s
b) Sine/Cosine form, a_n's and b_n's
c) Cosine form c_n's and ϕ_n's
d) Determine the fundamental frequency of periodic signals
e) Determine DC (average value, $\mathbf{x}_0$, a_0, c_0) of periodic signal
f) Apply signal symmetry properties to simplify finding a_n's, b_n's, c_n's, ϕ_n's, $\mathbf{x}_n$'s
g) Time $\rightarrow$ Frequency & Frequency $\rightarrow$ Time;
   Taking x(t) and creating Magnitude and two-sided spectral plots
   Taking Magnitude and two-sided spectral plots and finding x(t)
h) $\Sigma\, x((t-kT_0)/\tau)$ the spectral lines separated by $1/T_0$ and the envelope is related to τ.

19) Parseval's theorem for periodic waveforms