**Probability**
Axioms
Random Variables
  - Discrete
  - Continuous
  - Mixed
Distributions
  - Marginal
  - Joint
  - Conditional
  - Bayes Rule
Expect Value
  - Mean
  - Variance
  - Covariance
  - Correlation coefficient
Characteristic and moment generating functions
Random vectors
  - Mean Vector
  - Covariance Matrix
Multivariate Gaussian RVs
  - Linear Transformations of Multivariate Gaussian RVs
  - Linear transformation to form i.i.d. Gaussian components
  - Conditional Probabilities
Nonlinear Transformations of RVs
Bounds and Approximations
  - Chebyshev Inequality
  - Chernoff Bound
Sequences of RV’s
  - Central Limit Theorem

**Random Processes**
Definition
Autocorrelation function- $R_{xx}(t_1,t_2)$
Autocorrelation function $R_{XX}(\tau)$
  - Properties of $R_{XX}(\tau)$
  - Finding $\mu_X$ and $\sigma_X$ given $R_{XX}(\tau)$
Example RPs
  - Cosine RP
  - Random Binary Waveform
  - Markov Processes
  - Gaussian Processes
Stationarity
  - SSS
  - WSS