Topics for Test 2 on Intro to Probability

1. Sample Spaces and σ-algebras. Intuitive description. Definitions and use for finite sample spaces. Definition for real-valued sample spaces.

2. Probability Distributions, Cumulative Probability Distributions, Probability Density Functions (PDFs).

3. Binomial and Multinomial distributions.

4. Moments and Central Moments of Distributions.

5. Covariance Matrices.

6. Univariate and Multivariate Gaussian Distributions and PDFs.

7. Diagonalization of Covariance Matrices and PCA.

8. Covariance of Principal Component Transform, $\mathbf{y}$, of a random vector $\mathbf{x}$.

9. Geometric Interpretation of $\mathbf{y}$ in item 7 and the eigenvalues and eigenvectors of the covariance matrix of $\mathbf{x}$.

10. Gaussian Mixture Models.

11. Linear Combinations of Random Variables.