STAT 801: Mathematical Statistics

Course outline:

- Distribution Theory.
  - Basic concepts of probability.
  - Distributions
  - Expectation and moments
  - Transforms (such as characteristic functions, moment generating functions)
  - Distribution of transformations
- Point estimation
  - Maximum likelihood estimation.
  - Method of moments.
  - Optimality Theory.

  - Bias, mean squared error.
  - Sufficiency.
  - Uniform Minimum Variance (UMV) Unbiased Estimators.

- Hypothesis Testing
  - Neyman Pearson optimality theory.
  - Most Powerful, Uniformly Most Powerful, Unbiased tests.

- Confidence sets
  - Pivots
  - Associated Hypothesis Tests
  - Inversion of hypothesis tests to get confidence sets.

- Decision Theory.