

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.