# Outline for MA223 Notes

1. Distributional Quartet
   1. The Statistical Process
      1. Anatomy of a Dataset
      2. A Note on Codebooks
   2. Case Study: Paper Strength
   3. Asking the Right Questions (F1)
      1. Characterizing a Variable
      2. Framing the Question
   4. Gathering the Evidence (Data Collection) (F2)
      1. Goal of Sampling (distribution of population)
      2. Bias
      3. Good Sampling Schemes
      4. Observational vs. Controlled Experiments
   5. Presenting the Evidence (Data Summaries) (F3)
      1. Graphical Summaries (distribution of the sample)
      2. Numerical Summaries
   6. Assessing the Evidence (Variability in the Estimates) (F4)
      1. Sampling Distributions
      2. Null Distributions
   7. Quantifying the Evidence (F5)
      1. Specifying reasonable values
      2. Likelihood of the data
   8. Review of the Distributional Quartet
2. Five Fundamental Ideas in Action
   1. Case Study: Deepwater Horizon
   2. Fundamental Idea 1: Frame the Question
   3. Fundamental Idea 2: Get Good Data
   4. Fundamental Idea 3: Summarize with a Purpose
   5. Fundamental Idea 4: Model the Variability
   6. Fundamental Idea 5: Quantify the Likelihood
   7. Conclusion
3. Comparing the Mean Response for Multiple Groups (ANOVA)
   1. Case Study: ?
   2. FI1:
   3. FI2:
   4. FI3:
   5. FI4:
   6. FI5:
4. Classical Approach to ANOVA
5. Modeling the Mean Response as a Function (Regression)
   1. Case Study: ?
   2. FI1:
   3. FI2:
   4. FI3:
   5. FI4:
   6. FI5:
6. Classical Approach to Regression
7. Special Cases
   1. One-Sample Inference (t-test)
   2. Two-Sample Inference (t-test)
   3. Paired Inference (t-test)
8. Mathematical Tools
   1. Essential Probability
   2. Essential Calculus