STA-209 Exam 3 Topics

The **vast** majority of exam 3 content will be focused on linear regression and hypothesis testing. **This list is not exhaustive**, but will serve as a good guide. There will be a small bit of study design content that has been with us for awhile.

General

- ☐ parameter vs statistic
- ☐ defining parameters and statistics in context of a study
- ☐ describing aspects of a study
    - ☐ experiment vs observational
    - ☐ population/sample/case/explanatory/response var

Study Design

- ☐ randomization vs random sampling
- ☐ generalization vs causal conclusions

Hypothesis Testing

- ☐ Means, diff in Means, proportions, diff in proportions
- ☐ Setting up H0 and HA corresponding to the context
- ☐ Checking conditions
- ☐ How to calculate test-stats for each of these cases
    - ☐ Understanding parts of the test-statistic
- ☐ measuring difference between data and null value, measured by standard error
- ☐ P-values from R output
- ☐ P-value interpretations / definitions in context
- ☐ Answering research questions / conclusions using p-value
- ☐ Strength of Evidence Approach (conclusions)
- ☐ Decision Making approach
    - ☐ What do we do to see if p-values are significant (less than alpha?)
    - ☐ issues with this approach
- ☐ Type-I and Type-II error definitions and describing these in context

Linear Regression

- ☐ correlation (pearson / spearman)
- ☐ scatterplot description, judging forms of relationships
- ☐ ecological correlation (and fallacy)
- ☐ writing regression equations using R output
- ☐ interpreting slopes and intercepts (using both categorical and quantitative)
- ☐ prediction using the regression equation
- ☐ residual calculation
- ☐ R^2, adj. R^2 interpretations, using them to guide model selection, assess performance
- ☐ overall model fit using F-stat and p-value (know hypothesis statements!)
- ☐ individual slope/intercept tests using t-stat and p-value from summary output
- ☐ residual analysis and checking conditions/assumption