Chapter 2: Students should be able to:

- ☐ Identify and utilize point estimates for various population parameters.
- ☐ Formulate correct null and alternative hypotheses, including numeric expressions relating to the population parameters.
- ☐ Describe what a p-value represents in words.
- ☐ Decide if a relationship is statistically significant given a p-value and a significance level.
- ☐ Identify if an error is a Type 1 or Type 2 error and how the number of either error type relates to the significance level.
- ☐ Use 1 or 2 tail tests in correct situations for testing appropriate alternative hypotheses.
- ☐ Use a provided simulated sample distribution to determine appropriate p-values.
- ☐ List and check necessary conditions for the central limit theorem to hold.
- ☐ Describe the significance of the normal distribution and its importance to statistical inference.
- ☐ Identify and describe the shape and location of the normal distribution given summary statistics of a sample dataset.
- ☐ Standardize normal data by calculating a Z-score.
- ☐ Use both R and a Normal Probability Table to find corresponding percentiles for a Z-score and vice versa.
- ☐ Find percentiles above, below, or between particular Z-scores in a normal distribution.
- ☐ Evaluate if a distribution is normal or what the shape of its distribution is given a qq-plot.
- ☐ Determine a critical value ($z^\star$) for constructing a confidence interval at some percentage (e.g. 95% is 1.96)
- ☐ Construct and interpret confidence intervals.
- ☐ Determine what sort of hypothesis test should be run given the nature of their data and research question.

Chapter 3: Students should be able to:

- ☐ Identify and calculate a point estimate for a population proportion.
- ☐ List and check conditions for a sampling distribution of proportions to be normal.
- ☐ Calculate standard error values for both single and two-proportion tests.
- ☐ Perform a full hypothesis test for testing both a single proportion and a difference between proportions. This includes:
  - Determining the needed point estimate.
  - Calculating the appropriate standard error.
  - Determining a Z-score to find a p-value.
  - Concluding from the p-value the result of the hypothesis test.
- ☐ Realize the appropriate conditions when pooled proportions should be used for the null proportion and use them correctly.
- ☐ Construct and interpret confidence intervals for population proportions.

Chapter 4: Students should be able to:

- ☐ Describe how a t-distribution differs from a normal distribution and when each should be used.
- ☐ List and check conditions for a sampling distribution to assure it will follow a t-distribution.
- ☐ Calculate standard error values for both single and differences between 2 mean tests.
- ☐ Determine the degrees of freedom for a problem and describe how the number of degrees of freedom changes the shape of the t-distribution.
- ☐ Calculate a T-score and use R and a t-Distribution Table to find the corresponding percentiles.
- ☐ Calculate a critical value ($t^\star$) for constructing a confidence interval at some percentage.
- ☐ Realize when data is paired and can thus be combined to a single mean.
- ☐ Perform a full hypothesis test for testing a single (or paired) mean and a difference between means.
- ☐ Construct and interpret confidence intervals for population means.
- ☐ Describe in words what an ANOVA test is testing and when it would be applicable.
- ☐ Write null and alternative hypotheses for ANOVA testing.
- ☐ List and check conditions necessary for ANOVA testing to be reliable.
- ☐ Interpret output from an ANOVA test to make conclusions about the null and alternative hypotheses.
- ☐ Explain why we should use the Bonferroni correction for our significance levels when making multiple comparisons.
- ☐ Determine the value of $\alpha^\star$ given a dataset and value of α.