

## Things you need to know:

This list is by no means exhaustive; you should be studying everything we covered in class and the homework.

- 1) Definitions – “Key Terms” at the end of each chapter.
- 2) Hypotheses – Null, alternative (what they represent – the null is that any variation from the current theory is solely due to chance.)
- 3) Errors – Type I, Type II
- 4) Significance level, power of the test.
- 5) “Bag Problems”
  - a. State hypotheses
  - b. Decision Rules – (follow and create)
  - c.  $\alpha$ ,  $\beta$ ,  $1-\beta$
  - d. extreme directions, most extreme values, critical/cutoff value, rejection region, acceptance region
  - e. p-value
    - i. p-value approach – Reject  $H_0$  if  $p \leq \alpha$
- 6) Bias
  - a. Sampling methods
  - b. Experiment design
- 7) Observational Study vs. Experiment – Know terminology and definitions.
- 8) Plotting variables graphically
  - a. Types of variables
  - b. Distributions
    - i. Shape
    - ii. Symmetry
    - iii. Modes – unimodal, bimodal
    - iv. Skew
    - v. Uniform
  - c. Be able to read and create these graphical representations of data
    - i. Pie chart
    - ii. Bar graphs
    - iii. Frequency plots
    - iv. Histograms
    - v. Frequency Tables
    - vi. Timeplots
    - vii. Scatterplots
  - d. Given number tables you should be able to calculate
    - i. Conditional distributions of row(column) given column(row)
    - ii. Marginal distributions of row(column)

## 9) Measures

- a. Measures of Center
  - i. Mean
  - ii. Median
  - iii. Mode
- b. Measures of Variation
  - i. Range
  - ii. IQR
  - iii. Variance
  - iv. Standard Deviation
  - v. Quartiles
  - vi. Percentiles
- c. 1.5 IQR Rule
  - i. Recognize outliers
- d. Linear Transformations
  - i. Standardization

## 10) Distributions

- a. Density curves
- b. Normal Distribution
  - i. Standard normal distribution
  - ii. z-scores (standard scores)
  - iii. Empirical Rule
    - 1. 68% in  $[\mu - \sigma, \mu + \sigma]$
    - 2. 95% in  $[\mu - 2\sigma, \mu + 2\sigma]$
    - 3. 99.7% in  $[\mu - 3\sigma, \mu + 3\sigma]$
- c. Uniform Distributions
  - i. Given  $U(a,b)$ 
    - 1. Find height
    - 2. Find mean