

# STAT 8010 Statistical Methods I

## Homework 4

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**Due Date:** June 16, 11:59pm

### Problem 1

In the data set `Prob1.csv` you could find enrollment data for a **random sample** of students from the college of Liberal Arts and Engineering at a University during the 2016-2017 academic year.

- Create a contingency table for this data
- Let  $p = \mathbb{P}(Female|Liberal\ Arts)$  in that university. Construct a 95% confidence interval for  $p$ .
- Let  $p_1 = \mathbb{P}(Female|Liberal\ Arts)$  and  $p_2 = \mathbb{P}(Female|Engineering)$ . Perform a hypothesis test with  $H_0 : p_1 = p_2$  vs.  $H_a : p_1 \neq p_2$ .
- Use the contingency table to conduct a  $\chi^2$  test for independence from beginning to end. Use  $\alpha = .01$ .

**Problem 2**

The following information represents data gathered during an observational study of Clemson residents. The table depicts the number of people in categories based on marital status and level of happiness.

	Happy	So-So	Unhappy	Totals
Married	60	80	140	
Single	100	80	160	
Totals				

- Calculate and fill in the row and column totals as well as the overall total.
- Use the information above to create a table of expected counts.
- Construct a table of partial  $\chi^2$  values (a  $\chi^2$  value for each individual cell).
- What is the  $\chi^2$  value?
- What are the degrees of freedom (df)?
- At the  $\alpha = .01$  level, what is the  $\chi^2$  critical value?
- What is your conclusion?