# ENGR 0020 PROB & STAT FOR ENGINEERS I

## Recitation 9

**Teaching Assistant:** Shaoning Han
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Office Hour: Thursday 2:00 – 3:00pm, 1023 Benedum Hall

**Goals:**

1. To help to understand the lecture and homework questions.
2. To take quizzes for getting the feedback of the class. The quizzes will take 10 mins at the end of recitation.

1. **(Matlab, Hypothesis Test)**
   - Hypothesis test: www.mathworks.com/help/stats/hypothesis-tests-1.html
   - $z$-test: www.mathworks.com/help/stats/ztest.html
   - One sample $t$-test: www.mathworks.com/help/stats/ttest.html
   - Two sample $t$-test: www.mathworks.com/help/stats/ttest2.html
2. **(One sample hypothesis test, type I/II error; Exercise 10.24, p356)** The average height of females in the freshman class of a certain college has historically been 162.5 centimeters with a standard deviation of 6.9 centimeters. To see if there has been a change in the average height, we take a sample of 50 females in the present freshman class and test on the mean of the sample using significance level $\alpha = 0.1$.
   (a) Determine type I error.
   (b) Assume the population mean value is 160 and $\sigma = 7$. Determine the type II value and the power of this test.
   (c) If the random sample is 165.2 centimeters, use critical region and $P$-value respectively to draw a conclusion.
3. **(Two sample $t$-test with unknown $\sigma^2$ and without assuming equal variance; Exercise 10.35, p357 )** To find out whether a new serum will arrest leukemia, 9 mice, all with an advanced stage of the disease, are selected. Five mice receive the treatment and 4 do not. Survival times, in years, from the time the experiment commenced are as follows. At the 0.05 level of significance, can the serum be said to be effective?

| Treatment | 2.1 | 5.3 | 1.4 | 4.6 | 0.9 |
|---|---|---|---|---|---|
| No Treatment | 1.9 | 0.5 | 2.8 | 3.1 | |