

## Stp226 Review notes for Final Exam.

### 1. Know new vocabulary and symbolic notation :

- Point estimate of the population mean  $\mu$ .
- confidence interval, confidence level, Margin of error (E)
- t distribution, Ch-square distribution, degrees of freedom
- Null and alternative hypotheses
- Two - tailed, left-tailed, right-tailed alternative hypothesis
- rejection region
- test statistics
- significance level of the test ( $\alpha$ )
- p-value
- Type I and II errors
- Pooled sample standard deviation
- Paired samples

### 2. Remember our assumptions for CI and Hypothesis tests:

1. Normal populations or large samples.
2. Independent samples for tests for two population means.
3. If samples are paired (matched), differences should be normal or large samples.
4. All samples are simple random samples
5. If we have small samples and no normality assumption, use nonparametric methods (There are some described in the book, we did not talk about them, so you may omit this topic)

## Chapter 9

- Know all the steps in testing the hypotheses
- How to select appropriate  $H_a$
- Know the rejection regions for different  $H_a$ . Critical values are part of rejection region.
- Know how to compute a p-value for an observed test statistics for different  $H_a$ .
- When you reject  $H_0$ :
  - (i) when (  $p\text{-value} \leq \alpha$  ) or
  - (ii) when observed test statistics falls into rejection region.
- Know that when null hypothesis is rejected, you have evidence for alternative, but when you fail to reject null, there is no sufficient evidence for alternative ( for given significance level)
- Know that you use z-test when  $\sigma$  is known and t-test when  $\sigma$  is unknown.
  - Know how one sample two-tailed Z-test or t-test for  $\mu$  are connected with z-interval and t-interval procedures from Ch.8.

## Chapter 10

- Know the sampling distribution of  $\bar{X}_1 - \bar{X}_2$  for independent samples. **(10.1 skip)**
- Know how to test  $H_0: \mu_1 = \mu_2$  versus appropriate alternative hypothesis in each of the cases (for independent samples):
  1. Known population standard deviations (2 samples z-test) **(10.1 skip)**
  2. Unknown population standard deviations (but assumed equal)  
(2 samples t- test, pooled standard deviation)
  3. Unknown population standard deviations (not assumed equal) **(10.3 skip)**  
(2 samples approximate t- test, use  $df = \text{Smaller sample size} - 1$  or use calculator estimated  $df$ .)
- Know how to test  $H_0: \mu_1 = \mu_2$  versus appropriate alternative hypothesis for paired samples (only paired t- test).
- for all the cases above know how to compute and interpret CI for  $(\mu_1 - \mu_2)$ .
- Know connection between two-sided hypothesis test and confidence interval for  $\mu_1 - \mu_2$ :  
If CI contains 0, we can't reject  $H_0: \mu_1 = \mu_2$  for two tailed test (at the given  $\alpha$ )

## Chapter 11

- Assumptions:  
Large populations, much larger than a sample, for proportion inferences  
(for CI:  $x \geq 5$ ,  $n-x \geq 5$ , where  $x = \#$  of successes  
for hypothesis  $H_0: p = p_0$  test  $np_0 \geq 5$ ,  $n(1-p_0) \geq 5$   
for hypothesis  $H_0: p_1 = p_2$   $x_1, n_1 - x_1, x_2, n_2 - x_2$  all  $\geq 5$ )
- Know the sampling distribution of  $\hat{p}$
- Know how to test  $H_0: p = p_0$
- Know the sampling distribution of  $\hat{p}_1 - \hat{p}_2$
- Know how to test  $H_0: p_1 = p_2$  versus appropriate alternative.
- Know how to compute and interpret CI for  $p$  and  $p_1 - p_2$
- Know how to estimate a sample size for estimating  $p$  if  $\alpha$  and  $E$  are given.
- Know connection between two-sided hypothesis test and confidence interval for  $p$ .
- Know connection between two-sided hypothesis test and confidence interval for  $p_1 - p_2$

### Chapter 12 topics:

- Know properties of Chi-square distribution curve and be able to use Chi-square table.
- Be able to perform Goodness-of-fit test (12.2). Go over problems 12.15 or 12.16 and 12.18, go over examples and group work done in class
- Be able to perform Test of independence (12.4). Go over problems 12.57 and 12.58.