STA261: Exam II Study Guide

Be prepared to see the following material on the exam. Keep the following in mind:

1. You should focus as much on the usage of the ideas below and being able to write/converse about them as you do focusing on doing calculations.
2. The material in the book is relevant, too. Don't just study from your notes alone. Lecture notes alone do not cover everything that will be expected of you. A successful exam depends on reading and understanding the book!
3. Please remember that the exam will have the included aspect of a time limit, so prepare adequately. Minitab output and formulas will be provided when needed on the exam.

Chapter 3: Density Curves and the Binomial Distribution (sections 3.5, 3.6)

- Density curves are a general way of describing probability for variables measured on a continuous scale. (The normal distributions are one type of density curve). On a density curve, probability of an event = area under the density curve above the values included in the event.
- Independent trials model: know the necessary conditions (see **BInS** on page 107 in SW).
- Know how to compute probabilities associated with binomial distributed variables (Y = number of successes in n trials of the independent trials model) using the binomial distribution formula on SW page 107. Also know how to read and interpret similar output from Minitab's binomial calculator (CALC>PROBABILITY DISTRIBUTIONS>BINOMIAL…). Also, know how to interpret probability answers to any problem…..do not be satisfied solely with being able to calculate the number!

Chapter 4: Normal Distributions (all sections except 4.5)

- Use of the normal probability table (to be provided). Be able to use the normal table to find probabilities (areas) from known cutoff values and known cutoff values from probabilities (areas). *[This requires you to have your notational house in order. For example, a common mistake is to think "Z" is an area. It is not! "Z" is a cutoff value that produces a particular area. Do not mix these two things up.]*
- Standardizing $Y \sim N(\mu, \sigma)$ into $\mathbf{Z} \sim N(0, 1)$ through use of $Z = (Y - \mu)/\sigma$.
- Assessing normality using a normal probability plot: be able to interpret such a plot from Minitab.

Chapter 5: Sampling Distributions (sections 5.1-5.4)

- Know the concept of the "meta-experiment" and how it conceptually is used to describe how a statistic might behave from sample to sample. Know why this is important to understand.
- Apply the meta-experiment idea to both dichotomous populations (a population inhabited solely by "successes" and "failures") and continuous populations (inhabited by numeric, quantitative values)
- Apply these ideas (using binomial and normal models) to find probabilities associated with sample proportions ("p-hat") and sample means ("Y-bar").
- KNOW AND BE ABLE TO APPLY THEOREM 5.1. (Especially the Central Limit Theorem.)
- Know the differences between a *population* distribution, a *sample* distribution, and a *sampling* distribution (see SW page 163) and be able to discuss them.

Chapter 6: Confidence Intervals (sections 6.1-6.3)

- Know standard error (SE) vs standard deviation (SD) and the practical reasons for using SE.
- Be able to find a confidence interval (with any reasonable confidence level, not just 95%) for a population mean μ. This requires knowing how to use the Student's t-distribution and the t-table.
- Be able to verbally interpret any CI you find in the physical context of the particular problem.
- Know what "confidence" means and what it does not mean.
- Know how changing the confidence level and/or the sample size affects confidence interval results.