**STAT 3611 Lab3 Procedure S2015 Maghsoodloo**

1. Download the Lab3-data from Canvas and save as Lab3-S015 in your Lab-folder. As in Lab2, I have simulated N = 100 simple random samples of size n = 10 on the same Excel file as in my Lab2-SOLN. Again, compute the population parameters $\mu$, $\sigma^2$, $\sigma$, $CV_x$, and $V(\overline{x})$ for a random sample of size n = 10, in the D4-D9. This lab intends to illustrate the concept of random sampling variation in CIs for the population STDEV $\sigma$ and population proportion p, assuming normality for the underlying population. Recall from Lab1 that the TUS (Tensile Ultimate Strength) data suffered from heavy tails (kurtosis = 0.4823 as compared to zero), although its skewness = – 0.035 was very close to that of the normal of identically zero.

3. Again compute the 5 sample statistics $\mathbf{\overline{x}_i}$**,** $\mathbf{CF_i}$**,** $\mathbf{CSS_i}$**,** $\mathbf{S_i^2}$ and $S_i$ (i = 1, 2, …, 100) in columns O-S.

4. In columns T through X compute the 95% confidence limits $\sigma_L$ and $\sigma_U$ , and also upper one-sided confidence limit for p, bolding all 100 CIs (Confidence intervals) that do not contain the true population parameter. The upper one-sided 95% CI for population proportion is given by $p_U$ = $\hat{p} + Z_{0.05} \times \sqrt{\hat{p} \times \hat{q} / n}$ , where $\hat{q} = 1 - \hat{p}$.

5. Again, compute the approximate $E(\overline{\mathbf{x}})$, $E(\mathbf{S^2})$ and E(S) in the designated box, as in your Lab2, for my simulated 100 simple random samples each of size n = 10. Then, re-compute the approximate biases in $\overline{\mathbf{x}}$, $\mathbf{S^2}$ and S. What do you anticipate should happen to the amount of these biases? Estimate the $SE(\overline{x})$ from the 100 sample mean values and also from the approximated E(S).