MATHEMATICAL STATISTICS
MA 486/586–1C
SPRING 2012

HOMEWORK SCHEDULE

- **Due Jan. 23** Ch. 1 set A: 1-7
    (1) Show the following equivalent definitions for variance: $E(X - \mu)^2 = EX^2 - \mu^2$
    (2) Calculate the mean and standard deviation of a Binomial (n,p) rv.
    (3) Calculate the variance of a Normal $(0, \sigma)$ rv.
- **Due Feb. 3** Ch. 2 set A: 1-4, set B: 1-4,6,8-12
- **Due Feb. 8 (586 students)** Lab 1 (p. 295). Also, prove the Cauchy-Schwarz inequality

$$(\sum_{i=1}^{n} a_i b_i)^2 \leq (\sum_{i=1}^{n} |a_i|^2)(\sum_{i=1}^{n} |b_i|^2).$$

Use this to show that the correlation coefficient satisfies $|r(x,y)| \leq 1$.
- **Due Feb. 10** Ch. 2 set B: 14, Ch. 3 set A: 4-6, set B: 3,5,12,15, set C: 1,4
- **Due Feb. 15 (586 students)** Lab 2 (p. 296).
- **Due Feb. 17** Ch. 3 set D: 1,3,5,7b, set E: 1,5,6,7
- **Due Mar. 7** For this homework, use a calculator and the following data taken from iid random variables: $(21, 21, 23, 24, 26, 29, 29, 30, 31)$.
    (a) Find a 95.4 percent *Confidence Interval* for the true mean of the distribution.
    (b) If $\mu = 23.5$ and $\sigma = 3.6$, find the z-value, t-value, and their corresponding p-values.
    (c) Suppose $\mu = 23.5$ and $\sigma = 3.6$ for the larger ambient population (the distribution from which the above data is observed is the distribution of this ambient population). Using the significance level $\alpha = .046$, do we accept the null hypothesis, H_0, that the true mean of our data sample is $\mu_0 = 23.5$? Use both the Z-test and the t-test.
    (d) Repeat (c) with data: $(52.6, 54.7, 56.4, 61.8, 63.9, 65.1, 68.1, 75.2, 82.3, 87.7)$, $\alpha = .046$, $\sigma = 13$ and the null hypothesis $H_0 : \mu_0 = 75$.
- **Due Mar. 16** Ch. 7 set A: 2,3,4,6,8,9; Ch. 4 set A: 1,2,5
- **Due Mar. 28 (586 students, extra cred for 486 students)** Lab 3 (p. 297).
- **Due Mar. 28** Ch. 3 set B: 14(a-f); Ch. 4 set B 3(prove it),5,8,11,13,14, set C: 1
- **Due Apr. 11 (586 students, extra cred for 486 students)** Lab 4 (p. 297).
- **Due Apr. 27 (586 students, extra cred for 486 students)** Lab 5 (p. 298).