STAT/CSE 4340/EMIS 3340
Statistics for Engineers
May 2014

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Class meets May 15ᵗʰ through May 30ᵗʰ
Time: 9:30am – 2:30pm (this includes a 40 minute lunch break and two shorter 10 minute breaks).
Location: TBA.

Overview
By the end of the semester, you should have a solid foundation and understanding of basic statistical concepts as they pertain to various areas of engineering and computer science. Various techniques to analyze statistical data will be introduced and discussed in detail. The necessary statistical theory to establish these techniques will also be presented, as this will lead to further understanding of the topics covered. These skills should aid you in becoming an informed and critical consumer of scientific literature, as well as help in your development in your own scientific endeavors.

Grading
Your semester grade will be determined as follows:

Assignments (10)	80%	One at the end of each class.
Final Exam	20%	On May 30ᵗʰ.
TOTAL	100%	--

- Disability Accommodations: Students needing academic accommodations for a disability must first be registered with Disability Accommodations & Success Strategies (DASS) to verify the disability and to establish eligibility for accommodations. Students may call 214-768-1470 or visit http://www.smu.edu/alec/dass.asp to begin the process. Once registered, students should then schedule an appointment with the professor to make appropriate arrangements. (See University Policy No. 2.4; an attachment describes the DASS procedures and relocated office.)

- Religious Observance: Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

- Excused Absences for University Extracurricular Activities: Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalogue)

Learning objectives

After successful completion of the course, students should be able to
1. Calculate and interpret descriptive statistics from various populations.
2. Define and determine sample spaces, and calculate probabilities of various events.
3. Understand statistical independence and conditional probabilities.
4. Recognize several well-known discrete and continuous probability models and calculate corresponding probabilities.
5. Extend concepts to joint probability distributions and calculate correlation and covariance.
6. Understand the distribution of the sample mean and how this relates to the Central Limit Theorem.
7. Learn methodology of point estimation.
8. Calculate and interpret confidence intervals.
9. Conduct hypothesis tests and interpret results.

Learning outcomes

Students will be able to understand and apply the following: simple probability rules including conditional probability and Bayes theorem, main families of distributions such as normal, exponential, binomial, Poisson, basic statistical inference such as point estimation, confidence intervals and hypothesis tests.

Detailed outline of activities:

Thursday May 15: Introduction to probability. Sample spaces, probability rules, independence, conditional probability, Bayes Theorem. Assignment 1.

Friday May 16: Random variables and probability distributions, discrete distributions, continuous, joint distributions, basic rules of independence, conditional distributions etc. Assignment 2.

Monday May 19: Expectation and variance, effect of independence, covariance, correlation, Assignment 3.

Tuesday May 20: Discrete random variables, binomial, geometric, multinomial, Poisson. Assignment 4.

Wednesday May 21: Continuous random variables, uniform, exponential, normal, gamma, chi-square. Assignment 5.

Thursday May 22: Transformations of random variables. Assignment 6.

Friday May 23: Sampling distributions, especially t distribution, CLT, repeated sampling principle. Assignment 7.

Monday May 26: *Memorial Day (No Class)*

Tuesday May 27: Point estimation. Method of moments, examples of normal, exponential, binomial, Poisson. Assignment 8.

Wednesday May 28: One and two sample confidence intervals, for means, proportions, motivated by CLT. Assignment 9.

Thursday May 29: One and two sample hypothesis tests. Assignment 10.

Friday May 30: *Final exam*.

Readings:

In addition to the required text, comprehensive class notes will also be provided.

Texts:

Devore, J. L. Probability and Statistics for Engineers and the Sciences, Eighth Edition