

# STAT/CSE 4340/EMIS 3340

## Probability and Statistics for Engineers

### August 2013

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**Class meets August 6<sup>th</sup> through August 21st, 8:50-12:00 location TBA.**

#### Overview

#### Grading

Your semester grade will be determined as follows:

Assignments (10)	80%	One at the end of each class.
Final Exam	20%	On Wednesday August 21 <sup>st</sup> .
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:** To become familiar with the basic rules of probability, discrete and conditional distributions, and beginning statistical inference such as point estimation, confidence intervals and hypothesis tests.

**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:**

**Tuesday August 6th:** Introduction to probability. Sample spaces, probability rules, independence, conditional probability, Bayes Theorem. Assignment 1.

**Wednesday August 7th:** Random variables and probability distributions, discrete distributions, continuous, joint distributions, basic rules of independence, conditional distributions etc. Assignment 2.

**Thursday August 8th:** Expectation and variance, effect of independence, covariance, correlation, Assignment 3.

**Friday August 9th:** Discrete random variables, binomial, geometric, multinomial, Poisson. Assignment 4.

**Monday August 12th:** Continuous random variables, uniform, exponential, normal, gamma, chi-square. Assignment 5.

**Tuesday August 13<sup>th</sup>:** Transformations of random variables. Assignment 6.

**Wednesday August 14<sup>th</sup>:** *Possible field trip.*

**Thursday August 15<sup>th</sup>:** Sampling distributions, especially t distribution, CLT, repeated sampling principle. Assignment 7.

**Friday August 16<sup>th</sup>:** Point estimation. Method of moments, examples of normal, exponential, binomial, Poisson. Assignment 8.

**Monday August 19<sup>th</sup>:** One and two sample confidence intervals, for means, proportions, motivated by CLT. Assignment 9.

**Tuesday August 20<sup>th</sup>:** One and two sample hypothesis tests. Assignment 10.

**Wednesday August 21st:** *Final exam.*

### Readings:

There is no required textbook for this class. Below I list some resources which you hopefully will find useful. For the most part my notes and problems should be sufficient for this semester.

### Online:

<http://www.math.uah.edu/stat/>

(The above is a great reference work, which covers material that is at and above the level of this class.)

[http://wiki.stat.ucla.edu/socr/index.php/Probability\\_and\\_statistics\\_EBook](http://wiki.stat.ucla.edu/socr/index.php/Probability_and_statistics_EBook)

(Somewhat below the level of this class, but still useful.)

### Texts:

Kalbfleisch, J. G. Probability and Statistical Inference, Volumes 1 and 2. Springer-Verlag. (May be out of print. Volume 1 is a great introduction to probability; Volume 2 is a somewhat nonstandard treatment of statistics.)

Feller, W. An introduction to probability theory and its applications. Volume 1. Wiley. (A classic, early chapters are especially useful. Most of the rest is above the level of this class.)

Walpole, Myers, Myers and Ye. Probability and Statistics for Engineers and Scientists, 9<sup>th</sup> edition. Pearson. (Below the level of the class.)