

**STAT 509: Statistics for Engineers**  
E01 Fall 2014

**Class Meetings:** TR, 5:30 – 6:45 PM, Sloan College 104

**Instructor:** Peijie Hou (PJ)

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**Office Hours:** Tuesday/Thursday 3:30-5:00 PM or by appointment.

**Description:** (Prereq: Math 142 or equivalent) Basic probability and statistics with applications and examples in engineering. Elementary probability, random variables and their distributions, random processes, statistical inference, linear regression, correlation and basic design of experiments with application to quality assurance, reliability, and life testing.

**Learning Outcomes:**

- Understand and be able to correctly use basic statistical terminology.
- Recognize and evaluate variation in data using basic parameter estimation, hypothesis testing, analysis of variance and basic experimental design.
- Compare data sets using parameter estimation, hypothesis testing, analysis of variance and basic experimental design.
- Recognize and evaluate relationships between two variables using simple linear regression.
- Apply basic  $2^k$  design of experiments in order to study and improve engineering processes.
- Understand and be able to apply simple principles of probability, parameter estimation, hypothesis testing, analysis of variance, simple linear regression, and design of experiments to engineering applications.

**Textbook:** *Applied Statistics and Probability for Engineers*, 5<sup>th</sup> Edition, by Douglas C. Montgomery (Author), George C. Runger. The text book for this course is recommended, but **optional**. I will provide series of notes and handouts.

**Course Management:** We will use Blackboard, available on the internet at <https://blackboard.sc.edu/>. All the lecture notes and handouts will be uploaded in Blackboard.

**Computing:** We will use R, a popular and powerful free package, for computing purpose. You are expected to learn through examples covered in lectures. You can download R from <http://www.r-project.org/>. For theses who are interested in R programming, a good introduction can be found at <http://www.cran.r-project.org/doc/manuals/R-intro.pdf>.

**Calculator:** Each student will need a scientific/engineering calculator. You can use a TI-83/84 if you like, but it is not required. Bring your calculator to class.

**Cell Phones:** They don't exist. Keep them out of sight and turned off. You may not use a cell phone in place of a calculator in class or on tests.

**Attendance:** It is expected that all students will attend all classes.

**Grading:**

Class Midterm I	20%
Class Midterm II	20%
Quizzes	15%
Comprehensive Final Exam	45%
TOTAL	100%

**Grading Scale:**

A	90-100%	C	70-76.9%
B+	87-89.9%	D+	67-69.9%
B	80-86.9%	D	60-66.9%
C+	77-79.9%	F	Less than 60%

**Details on Graded Assignments:**

**In-class exams (20%+20%):** The two midterms will take place in late September and early November respectively. They will cover all materials through the time of the exams.

**Final Exam (45%):** The final exam for this course will be comprehensive and will take place on Tuesday, December 9 - 7:30 p.m.

**Homework (15%):** There will be regular homework assignments. Students are expected to read the book and work problems as required to master the material. However, the homework will **NOT** be collected. I will copy one or two **exactly the same** questions from your current homework and put them into a quiz, which will be given in the beginning of the lecture. Please note: students who are late for the quiz will not be given a quiz.

**Outline of Topics Covered in STAT 509**

Topic	Text Sections	Topic	Text Sections
Probability	Chapter 2	Inference for a Single Mean	Section 8.1, 8.2, 9.2, 9.3
Discrete Random Variables	Chapter 3 (geometric, hypergeometric, binomial, Poisson)	Inference for Variances	Sections 8.3, 9.4
Continuous Random Variables	Section 4.1-4.5, 4.8	Inference for two Populations	Sections 10.1, 10.2, 10.4- 10.6
Normal Distribution	Section 4.6	Simple Linear and multiple Linear Regression	Section 11.1-11.8. Section 12.1- 12.5
Sampling Distributions	Section 7.2, 7.3	Analysis of Variance	Sections 13.2
Inference for proportions	Sections 8.4, 9.5	2 <sup>k</sup> Factorial Based Experiments	14.1-14.5, 14.7.1

**Honor Code:** See the *Carolinian Creed* in the *Carolina Community: Student Handbook & Policy Guide*.