George Mason University
The Volgenau School of Information Technology and Engineering
Department of Statistics

STAT 554: Applied Statistics

Fall Semester, 2009
Wednesdays from 7:20 pm – 10:00 pm
Location: **Innovation Hall 133**

Instructor: Prof. Larry Tang
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Phone: 703-993-9111
Office Hours: 6:00 pm – 7:00 pm & 10:00-10:30 pm on class days and by arrangement
Office Location: Engineering Building, Rm 1710

Teaching assistants: Ms. Liang Li, Office Hours: 4-6 p.m. on Tuesdays

Required Texts:

- *Beyond ANOVA: Basics of Applied Statistics, Reissue edition*, by R. G. Miller, Jr. (Chapman & Hall, 1996)
- *Statistical Concepts and Methods*, by G. K. Bhattacharyya and R. A. Johnson (Wiley, 1977)

Recommended Texts:

- *Fundamentals of Modern Statistical Methods: Substantially Improving Power and Accuracy* by R. R. Wilcox (Springer, 2001)
- *Biostatistical Analysis, 4th ed.*, by J. H. Zar (Prentice Hall, 1999)

Description:
The main goal of this course is to introduce you to some basic statistical techniques, and to teach you when and how to apply them. The focus is on the data analysis rather than the statistical theory (however, there will be some theory). Methods useful for the analysis of experimental data are emphasized, and specific topics covered include one and two sample tests and confidence intervals for means and medians, descriptive statistics, one-way and two-way ANOVA, simultaneous inferences, goodness-of-fit tests, categorical data analysis, and regression analysis. In general, for each type of problem, the classical normal theory method will be introduced first. Then I will discuss what happens if the assumptions aren't met, and alternative robust and nonparametric techniques will be presented. For each topic, students should gain insight on what to do when confronted with data. This course serves as an introduction to STAT 655, STAT 656, STAT 657, STAT 663, and STAT 665.

Prerequisite: STAT 344 or MATH 351

Class requirements:

- *Lectures.* Lectures are critical for the understanding of the material. I will put lecture handouts a couple of days in advance on courses.gmu.edu. There will be some material and homework that will not be from the textbook, and so there will be no way to do well in the class without attending and understanding lecture materials. It is assumed that students will take careful notes in class.

- *Homework.* Homework will be assigned *weekly*. *One week* will be given to finish the homework. Homework will be collected before class on the due date. **No late homework will be allowed except under very unusual circumstances.** You are encouraged to discuss homework problems with one another or work in groups. However, you should write your solutions independently. Duplicating others' homework constitutes a violation of the university academic integrity policy.

  The homework should be neat with the pages stapled together in the upper left corner. The problems should be in sequential order. Answers should be circled. Only paper copies will be accepted – no emails or faxes.

- *SAS.* Homework will involve some programming tasks in SAS. Students are free to use any appropriate software packages, but examples of programming will be given in SAS and assistance will only be given for SAS.

Grading:

- 30% for homework assignments
- 30% for midterm exam
- 40% for final exam

Grading Scale

A	A-	B+	B	B-	C	F
90 – 100	86 – 89	80 – 85	75 – 79	70 – 74	56 – 69	0 – 55

Exception: by GMU policy, any student who does not take the in-class final exam will receive a grade of 'S/A' (stopped attending), which becomes an F on their transcript, regardless of their points earned.

Additional Comments:

- Put **STAT 554** in the subject line when you send me e-mail
- You are expected to familiarize yourself with the George Mason University honor code and abide by it
- You are expected to take the exams during the designated time slot; Incompletes will not be granted except under *very* unusual circumstances

Temporary Class Schedule:

WK	Date	Lecture Topics	
1	Sep-2	***Syllabus:***	Syllabus, Textbooks, Assignments
		General Topics:	Introduction to estimation and hypothesis testing
2	Sep-9	Normal distributions; random sampling; transformations	
3	Sep-16	One sample inference, power of tests	
4	Sep-23	Binomial outcomes; theoretical considerations	
5	Sep-30	Nonparametric procedures for one sample; Inferences based on two samples	
6	Oct-7	Nonparametric methods, Behrens-Fisher problem	
**	Oct-14	**Midterm Exam**	
7	Oct-21	One-way ANOVA; Multiple comparisons; Related nonparametric methods	
8	Oct-28	Nonparametric methods for the *k*-sample problem, the random effects model	
9	Nov-4	Two-way ANOVA; Friedman's rank test, randomized block design & additional designs	
10	Nov-11	Simple linear regression; Correlation and measures of association,	
11	Nov-18	Multiple regression, Model checking	
12	Dec-4	Categorical data analysis, goodness-of-fit tests, contingency tables	
13	Dec-11	Review, Evaluations	
**	Dec-18	**Final Exam**	