

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

**STAT 435/535: Analysis of Experimental Data Using SPSS**

Fall Semester, 2009

Thursdays from 7:20 pm – 10:00 pm

Location: Innovation Hall 208

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**Instructor: Prof. Larry Tang**

Email: ltang1@mail.gmu.edu

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

**Required Texts:**

- [Statistics for the Life Sciences, 3rd ed.](#), by Samuels and Witmer, 2003
- [Modern Statistics for the Life Sciences](#), by Grafen and Hails, 2002

**Description:**

Statistical methods for the analysis of experimental data, including ANOVA and regression. After a brief review of elementary probability, both parametric and nonparametric inference methods appropriate for a variety of experimental designs are presented, and the use of appropriate statistical software is taught.

- Intended primarily for researchers in the natural sciences, the objective of the course is to prepare researchers to design and conduct good experiments, to competently do the subsequent data analysis, and to understand their results and reach scientifically valid conclusions.
- This course can be used to satisfy the requirements of the Certificate in Federal Statistics, but *cannot* be used to satisfy the requirements of the M.S. in Statistical Science.
- Some programs may not grant credit for more than one of STAT 510, STAT 535, and STAT 554.

**Prerequisite: STAT 250 or IT 250 or equivalent (e.g., BIOL 312)**

**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](http://courses.gmu.edu). There will be some material and homework that will not be from either 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 biweekly. Two weeks 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.*

- *Project.* You will identify a data set and related questions to investigate (preferably in your field for graduate students), subject to my approval of your written proposal. You will then carry out a detailed analysis using statistical methods learned in this course, and write a formal report no more than 3 pages on your findings. You will give a 10-minute oral presentation and submit the written report on the last day of the class (Dec 12, 2009).
- *SPSS.* Homework will involve some programming tasks in SPSS. Students are free to use any appropriate software packages, but examples of programming will be given in SPSS and assistance will only be given for SPSS.

**Grading:**

- 20% for homework assignments
- 5% for project
- 35% for midterm exam (open book and notes)
- 40% for final exam (open book and notes)

***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 535** 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.

**Tentative class schedule:**

- S&W = *Statistics for the Life Sciences*, 3rd ed., by Samuels and Witmer, 2003
- G&H = *Modern Statistics for the Life Sciences*, by Grafen and Hails, 2002

WK	Date	Lecture Topics		Chapters
1	Sep-3	<b>Syllabus:</b>	<ul style="list-style-type: none"> <li>• Syllabus</li> <li>• Texts</li> <li>• Assignments</li> </ul>	S&W: Ch. 1 & Ch. 3
		<b>Topics:</b>	Introduction; Elementary probability theory; Binomial distributions	
2	Sep-10	Normal distributions; Descriptive statistics; Introduction to SPSS		S&W: Ch. 2 & Ch. 4
3	Sep-17	Sampling distributions; Confidence intervals		S&W: Ch. 5 & Ch. 6
4	Sep-24	Hypothesis testing; Statistical methods for two-sample experiments		S&W: Ch. 7
5	Oct-1	Nonparametric test; Basics of experimental design; Matched-pairs experiments		S&W: Ch. 8, Ch. 9.1-9.3
6	Oct-8	Matched-pairs experiments		S&W: Ch. 9
**	Oct-15	<b>Midterm Exam</b>		
7	Oct-22	One-way ANOVA; Multiple comparisons; Related nonparametric methods		S&W: Ch. 11 (except Sec. 11.6) G&H: Ch. 1
8	Oct-29	Simple linear regression; Correlation; Introduction to multiple regression		S&W: Ch. 12 G&H: Ch. 2, 4
9	Nov-5	More on multiple regression		G&H: Ch. 4
10	Nov-12	Analysis of covariance (ANCOVA)		G&H: Ch. 4 & Ch. 6
11	Nov-19	<b>More on ANOVA:</b> two-way ANOVA, random effects, other designs		S&W: Sec. 11.6 G&H: Ch. 12
12	Dec-5	Categorical data analysis; Summary and brief mention of other topics		S&W: Ch. 10 & Ch. 13 G&H: Ch. 13 & Ch. 14
13	Dec-12	10-min oral presentation; Review		
**	Dec-19	<b>Final Exam</b>		