

Winter, 2014

## Stat 418 – Analysis of Cross Classified Data

**Instructor:** Dr. Beth Chance  
**Class Time:** M, T, W, F 11:10-2:00, Studio Classroom (38-123)  
**Office:** Faculty Office Building East 25-235  
**Phone:** 756-2961 (×62961 on campus)  
**Email:** bchance@calpoly.edu (a very good way to reach me)  
**Office Hours:** Tuesday 1-2pm, Wednesday 12-1pm, Thursday 2-3pm, Friday 9-10am, and by appointment, email, and anytime my office door is open.

**Course Webpages:** PolyLearn (<http://my.calpoly.edu>)  
<http://statweb.calpoly.edu/bchance/stat418/>  
The PolyLearn page includes access to course grades, a News Forum, and a Q and A forum for asking questions on course logistics and course material.  
**Course Listserv:** stat-418-01-2142@calpoly.edu

**Prerequisite:** Two statistics courses including Stat 324 or Stat 524.

**Course Objective:** To expose students discrete multivariate analysis, including the analysis of cross-classified data, log-linear models for multidimensional contingency tables, goodness of fit statistics, measures of association, model selection, and hypothesis testing.

### Texts/Materials:

Required: *An Introduction to Categorical Data Analysis* (2<sup>nd</sup> edition), A. Agresti, Wiley (2007)

Access to statistical software (e.g., Minitab, R, SAS, or JMP), internet

You should also have a USB drive, a scientific calculator, an email address, and a large three-ring binder. You are required to have access to software and the internet outside of class. Additional lecture handouts will be supplied in class, you are responsible for receiving and keeping these materials. Handouts from previous lectures will be available from the course web pages.

**Statistical Packages:** We will be using a variety of statistical packages, but mostly JMP. All of these are available for free on your home computer. You will have access to instructions for how to use the technology but will also be expected to expand on what is done in class using on-line help. In general for homework assignments, *your output must be integrated into the main body of the write up.*

You are also required to bring a scientific calculator with you to each class session.

**Grading:**

Class Participation/Examples/Investigations:	15%
Homeworks:	25%
Exams:	60% (15%, 20%, 25%)

**Class Participation/Turn in Questions:** There will be numerous “discussion questions” assigned as well as examples that you complete in class and/or between classes (using the PolyLearn discussion board) and turn in your answers to me. These (about 15-20) will be graded, but predominantly in terms

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of “was seriously attempted” vs. “was not really attempted” vs. “not submitted.” You need to be prepared to discuss your analysis to a particular problem to the rest of the class.

**Homeworks:** You are encouraged to work together on assignments but must write up your solutions individually and hand in your own work. (“Investigation” assignments can be done in pairs.) If I determine assignments are too similar, I will divide the grade among the individuals. You are also encouraged/expected to ask questions on the material during and outside of class. You are expected to utilize the computer for much of your analysis and must **INCLUDE ALL** relevant output with your assignment for full credit. Graded assignments will be returned in class or can be picked up from me. Late submissions will **NOT** be accepted, but I will review previous assignments with you if you complete them after the deadline. Your lowest homework score will be dropped. You are advised to not use this up too early in the quarter and to start your assignment early in the week. After the due date, homework solutions will be posted in PolyLearn. The main requirement for all problems is that you **EXPLAIN** your answers. Often, questions may have more than one correct answer so several answers will be accepted as long as they are **JUSTIFIED**. You should also state any **ASSUMPTIONS** that you make. Soon you will be explaining your results to managers and people outside your discipline, so you need to get used to explaining and backing up the numbers in English! You’ll also be given partial credit for your work, so it is important to at least attempt each problem.

**Exams:** There will be two in class exams and a comprehensive final. Graded exams will be returned in class or can be picked up from me. You will be given at least one week’s notice of the exam dates. The final exam will be held Wednesday, March 20, 1:10-4pm.

**Make-up Policy:** Make-up oral exams will be given to students who notify me (with appropriate proof) at least two days before the exam of their unavoidable absence.

**Classroom Culture:** The textbook will serve as a guide but I expect to supplement the material in the textbook extensively. It will be important for you to come to class, to participate fully, to ask questions, and to be responsible for all course handouts. This will allow us to focus more on the interpretation and presentation of statistical analyses. I cannot overemphasize the importance for you to follow along with the reading assignments and to ask questions of me for any components that are not clear. I hope to create a collaborative learning environment, where you feel comfortable asking questions and working together. Still, I do ask that when I am lecturing that you give me your complete and undivided (or at least silent) attention.

#### **Advice from my Winter 2013 Stat 418 students**

- Make sure to start the HW early in the week/ as early as possible (3)/ Expect the HW to take you 5+ hours at least. Some homeworks are much longer than anticipated, and can make for some very late Thursday nights.
- Study your notes every night /Be prepared to work hard and to learn a lot. Doing the practice problems, homework and investigations is not enough to get by. Not only should you start studying a while before exams, you should clarify things that were unclear about the lecture as they come.
- Ask her questions through email or office hour (5). I learned the value of this halfway through the quarter, and wish I had taken advantage of it from the beginning. Go to office hours, e-mail when needed, don't wait until the last minute before exams to ask for clarification on material.
- Stay on top of the homework, go to class (2), and ask questions if you are confused (2).
- Read the book before lecture take your own notes, it is very helpful (2).

## Tentative Course Outline

Lect	Date	Day	Reading	Topic	Due
1	1/6	M	Sec 1.1	Introduction	Survey
2	1/7	T	1.2, 1.4	Binomial random variables	
3	1/8	W	1.3	Maximum Likelihood Estimation (MLE)	
4	1/10	F		Confidence intervals (Inv 1)	HW 1
5	1/13	M	2.1	Two-way tables, Sampling	
6	1/14	T	2.2, 2.6	Comparing two proportions, FET	Inv 1
7	1/15	W	2.3	Relative risk, odds ratio	
8	1/17	F		Confidence intervals (Inv 2)	HW 2
	1/20	M		<b>No Classes</b>	
9	1/21	"M"	2.4	Chi-square tests	
10	1/22	W		Review	Inv 2
	1/24	F		<b>Exam 1 (Ch. 1-2)</b>	
11	1/27	M	2.5	Ordinal Tests	
12	1/28	T	2.7	Three-way tables (Inv 3)	
13	1/29	W	p. 114-5	CMH Test, conditional odds ratios	
14	1/31	F	3.1	Generalized Linear Model	HW 3
15	2/3	M	4.1	Logistic regression models	
16	2/4	T	4.2	Inference for logistic regression	Inv 3
17	2/5	W	4.3, 4.4	Multiple logistic regression	
18	2/7	F		Residuals/Lack of Fit (Inv 4)	HW 4
19	2/10	M		Residuals, Influence, Model Selection	
20	2/11	T	5.1, 5.2	Summarizing predictive power (Inv 5)	Inv 4
21	2/12	W	6.1	Multi-category logit models	
22	2/14	F	6.2	Cont.	HW 5
	2/17	M		<b>No Class</b>	
23	2/18	T		Misc	
24	2/19	W		Review	Inv 5
	2/21	F		<b>Exam 2 (Ch. 3-6)</b>	
25	2/24	M	6.2	Ordinal logistic regression	
26	2/25	T	3.2	Probit and Gombit regression	
27	2/26	W	3.3	Poisson regression	
28	2/28	F		Poisson regression continued	HW 6
29	3/3	M	Ch. 7	Loglinear models	
30	3/4	T		Continued	Inv 6
31	3/5	W		Three-way tables	
32	3/7	F		Three-way interactions	HW 7
33	3/10	M		Loglinear vs. logistic regression	
34	3/11	T	8.1	Matched pairs	Inv 7
35	3/12	W	8.2	Logistic regression for matched pairs	
36	3/14	F		Review	HW 8
	3/21	F		<b>Final Exam 10:10-11pm- Tuesday??</b>	

Last day to drop class: Jan. 15