

Stat 414 – Multilevel and Mixed Modelling

Instructor: Beth Chance

Class Time: Tues/Thur 9:10-11am, 38-123 (Stat Studio)

Office: Faculty Office Building East 25-235

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Email: bchance@calpoly.edu (a very good way to reach me)

Office Hours: Mon 7-8pm (online), Tue 1-2pm, Wed 9:30-10:30am, Thu 1-2(3)pm, Fri 10-11am, and by appointment, email, and anytime my office door is open.

Course Webpages: PolyLearn (<http://my.calpoly.edu>)
<http://www.rossmanchance.com/stat414/lectures.html>

Course Listserv: stat-414-01-2198@calpoly.edu

Pre-requisite: Successful completion of STAT 324 or STAT 334 or STAT 524

Course Overview:

Overview of multilevel and mixed models, including hierarchical data, intraclass correlation, fixed vs. random coefficients, variance components, comparisons to traditional analyses. Use of statistical software for implementation of methods. 4 lectures

Texts/Materials:

Required:

- *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling (2nd edition)*, Snijders & Bosker, Sage Publishing
- Additional course notes supplied by the instructor

Additional Recommended References: (See discussion in PolyLearn)

- Bickel, R. (2007) *Multilevel Analysis for Applied Research: It's Just Regression*. Guilford Press.
- Raudenbush, S., & Bryk, A. (2002) *Hierarchical Linear Models* (2nd ed.). Thousand Oaks, CA: Sage.
- Hox, J. (2002). *Multilevel Analysis: Techniques and Applications*. Mahwah, NJ: Erlbaum.

You are encouraged to keep the handouts and your notes together in a three-ring binder. You should also have a scientific calculator. You will need out-of-class access to JMP and/or R statistical packages. PowerPoint slides and handouts from previous lectures will be available on the course web pages.

Grading:

Homework and Lab Assignments	25%
Project	15%
Exams	15%, 20%, 25% (final)

Coursework:

- *Lab assignments* will be assigned periodically and will directly follow from in-class work. You should work together with a partner on these and submit one assignment with both names.
- *Homework problems* will be assigned roughly once per week. You will generally have one week to complete the assignments. The intention is for you to work on this assignment throughout the week. If you wait until the evening before, you will not have enough time to complete the assignment. You are encouraged to work with other people in the class and to submit questions to the course alias/discussion board, **but the work you turn in must be written up individually**. If I determine write-ups are too similar, the score will be divided among the matching papers. No late homework assignments will be accepted. You will be allowed to drop your lowest homework grade. Solutions will be posted online.
- There will be a *data analysis project*. You may work alone or with one partner. The purpose of the project is to give you an opportunity to apply what you have learned in this class to your research area. You can use data you have collected or gathered from a reliable source. Reports will be graded on quality of statistical analysis as well as presentation of results and appropriateness of interpretations and conclusions. You should anticipate being asked to give an oral presentation at the end of the course.

Exams: There will be two in class exams and one comprehensive final. Graded exams will be returned in class or can be picked up from the instructor.

Advice:

1. Come to class.
2. Participate in class.
3. Work together.
4. Ask questions.
5. Review your notes often.
6. Check the course webpage and email list regularly.
7. Start the assignments early.
8. Take the course seriously.
9. Have fun with the material.
10. Think!

Above all, you are responsible for your own learning. As your instructor, my role is providing you with contexts and opportunities to facilitate the learning process. Please call on me to help you with this learning in whatever ways I can.



Fall, 2019

	Day	Date	Reading	Topic	HW Due
1	R	9/19	Ch. 1	What is a GLM? Review of Linear Regression Model	Initial survey
2	T	9/24	Ch. 2	Estimation (e.g., least squares,	
3	R	9/26		maximum likelihood), Inference	HW 1
4	T	10/1		Violations of linear models	
5	R	10/3		GLS	HW 2
6	T	10/8	Ch. 3	Standard errors	Project 1
7	R	10/10		Fixed vs. Random effects, ICC	HW 3
8	T	10/15	Ch. 4	Slopes as outcomes	
9	R	10/17		Review	Exam 1
10	T	10/22	Ch. 5	Multilevel models	
11	R	10/24		Level 2 covariates	HW 4
12	T	10/29	Ch. 7	Centering	
13	R	10/31	Ch. 10	Diagnostics	HW 5
14	T	11/5	Ch. 4	Three level models	Project 2
15	R	11/7		Variance components	HW 6
16	T	11/12	Ch. 15	Longitudinal data	
17	R	11/14		Review	Exam 2
18	T	11/19	Ch. 17	Discrete outcomes	
19	R	11/21			Project 3
Happy Thanksgiving					
18	T	12/3			Presentations
19	R	12/5			Final report
Final Exam: Tuesday, Dec. 10, 10:10-1pm					