Advanced Statistical Concepts and Methods
Winter 2018
Math 410A (Section 2)
Meeting times: Monday and Wednesday, 1:00 – 1:50 in Boullion 106
Friday, 2:00 – 3:15 in Boullion 103 (computer lab)

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Office Hours: MWF, 10:00–11:00, TTh, 9:00–10:00, and by appointment

Course Goals and Description: This course is the first of a two-part sequence designed to cover beginning and intermediate regression, ANOVA, and non-parametric statistical models. We will learn the theory behind these models, and we will spend a lot of time using them to answer questions about real-world data. Topics will likely include: linear regression, multiple regression, logistic regression, inference from regression, and ANOVA.

The first half of the course (410A) will include some very basic ANOVA, a lot of more advanced details about regression, and an introduction to R. The second half (410B) will include many details about ANOVA, non-parametric statistics, and modern permutation and bootstrap methods. This part of the course will include a significant component on presenting statistics in public.

We will begin a significant project during the winter term in which we provie data analysis for a business or government partner. A significant part of your work in this class will revolve on this analysis, and on your ability to share the data (in written and oral format) with our partner.

Required Text: Ann R. Cannon, et al. *Stat 2: Building Models for a World of Data*, WH Freeman.
Recommended Text: Jared P. Lander, *R for Everyone: Advanced Analytics and Graphics*, Addison Wesley Data & Analytics Series.

Evaluation and Grading: Grades will consist of four components: (almost) weekly labs (20%), homework and reading responses (10%), two midterm exams (20% each), and a large quarter-long project (30%) in which you will complete and write about a significant statistical analysis of your own or with your team. This may serve as a prelude to a larger project you will complete in Math 410B.
Grades will be assigned according to the following scale:

		A	93-100%	A- 90-92.99%
B+	87-89.99%	B	83-86.99%	B- 80-82.99%
C+	77-79.99%	C	73-76.99%	C- 70-72.99%
D+	67-69.99%	D	63-66.99%	D- 60-62.99%
		F	59.99% and below	

Details concerning course components

"R skills" labs
The course will feature three labs which introduce you to, and let you practice, sets of specific advanced skills in R.
Each of these labs will contain a short introduction, a reference to one or more resources for mastering the technique, and a set of challenges for you to complete.

Homework
A small amount of homework will be assigned from the book most weeks. These problems are designed to let you practice the basics of the new statistics we are covering, and the corresponding techniques in R.

Reading Responses
Each day for which a reading is assigned (probably every day), you are to send me a brief (1-3 paragraphs or so) email about the reading. In the email, you could tell me something that you found interesting, and what you still have questions about. Perhaps there are questions which the reading suggests but doesn't answer that you'd like us to discuss in class. These are *due by 10:30 on the day of class*, so that I can read them before I come to class. Your responses, summaries, and points of confusion will help guide our discussion of the day.
Important: In order for me to receive for reading response, it must be sent in reply to an email you will get from me after class. This will allow me to collect all of your responses together, and read them before class.

Midterm Exams
There will be two take-home mid-term exams, given roughly during Week 5 and Week 9.

General Course Policies: Come to class. Do your own work. Work really hard; this class is likely to be quite difficult, but you will leave it with a useful set of skills, and a better understanding of statistics!

Students with disabilities who wish to set up academic adjustments in this class should give me a copy of their "Confirmation of Eligibility for Academic Adjustments" from the Center for Disability Services as soon as possible so we can discuss how the approved adjustments will be implemented in class. Students without this form should contact the Center for Disability Services, Bouillon 205 or dssrecept@cwu.edu or 963-2171.

I reserve the right to change the policies contained in this syllabus as dictated by developments during the quarter.

Exams:
Exams will both be given as take-home exams, and you will have one week to complete them. During this time you may use any sources you like except for other people.