

## MATH 256: Statistical Models, Spring 2015

Professor: Dr. Rob Erhardt

Office: 342 Manchester Hall

Office Hours: (Manchester 342) Wednesdays 10:00AM-12:00PM, and by appointment

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TA-led Homework and Review Sessions: Thursday 7-9PM (Xiaochen Hu), Tuesday 7-9PM (Gregory Conklin, [conkgp13@wfu.edu](mailto:conkgp13@wfu.edu)), held in **Kirby 120**.

1. **Location and Time:** 1:00-1:50 MWF, Manchester 125
2. **Book:** Stat2 by Cannon et. al (<http://www.whfreeman.com/catalog/Product/stat2-cannon>). Buying a used copy is fine, we won't need the online access code.
3. **Prerequisites:** This course has the following prerequisite requirement: MTH 109, ANT 380, BIO 380, BEM 201 or 202, ECN 209, HES 262 or 360, PSY 311 or 312, SOC 271, or POI. The intention is for this course to serve as "Stat 2". Please come see me if you are concerned you may not have enough of a "Stat 1" background, or took a different course not listed here.
4. **Outline:** This is a class in building, interpreting, and presenting results from statistical models. Consider what is needed to make useful, data-driven statements like the following:
  - "After controlling for gender, we found the described voter registration drive increases election day voter turnout by 2%."
  - "After controlling for family income and education levels, we found boarding school graduates were 13% more likely to graduate from college in 4 years than non-boarding school graduates."
  - "Although it appears shorter people pay significantly more for haircuts, this relationship vanishes once we control for gender."
  - "The square footage of a house is more predictive of selling price than the total number of rooms."

Behind each of these statements is a statistical model built with mathematical and computational care, and a careful interpretation of results. This is what we will learn to do. Specifically, we will study multiple linear regression, inference and testing (chapters 1-4), factors and interactions (chapters 5 and 6) and logistic regression (chapters 9 and 10). You will often have the opportunity to emphasize data in your own area of interest (finance, medicine, politics, social sciences, education, etc.).

## 5. What is Assigned:

- **Assignments:** (20%) We will have weekly homework assignments due in class each Friday. Assignments will blend some mathematical work with applied data analysis. Assignments must be typed, except for certain mathematical problems where handwritten answers are OK. Plan on assignments requiring 4-6 hours per week.
  - **Exams:** (20% each) There will be three exams. The first two will be in class, on **Wednesday February 25** and **Wednesday April 8**. The third exam will be during our final exam period, 2:00PM on **Friday May 1**, but it is not cumulative, not longer in length, and still only counts 20%.
  - **Final Project:** (20%) The final project will be to analyze a dataset of multiple variables, and write a full report on your findings. The data can be chosen from any discipline. You may work with at most one other person. The dataset and a proposal of your project is due on **Wednesday April 1**. The project itself is due in our last class on **April 29**.
6. **Software:** We will use R, a free statistical software program which can be found here: (<http://cran.us.r-project.org/>). **R Commander** is a lovely graphical interface that makes using R much easier. No previous computer programming experience is needed.
  7. **Grading:** Grades follow the standard scale, with cutoffs: 93 A, 90 A-, 87 B+, 83 B, 80 B-, 77 C+, 73 C, 70 C-, 67 D+, 63 D, 60 D-, and below 60 is F. Modest curving of grades *may* be used, but only at the end of the semester.
  8. **Honesty and Courtesy:** Academic dishonesty of any sort will not be tolerated, and could result in an immediate grade of F. Refer to <http://services.studentlife.wfu.edu/judicial-affairs/honor/>. Phones, laptops, and other electronic devices are distractions when used for non-academic work in class. There is a mountain of research that shows we do lower quality work when distracted by electronic devices. Additionally, I find it extremely disheartening when I see students distracted by electronic devices during class. Surely you can last 50 minutes disconnected.
  9. **Getting Help:** Come to my office hours, or e-mail me and set up an appointment. Please contact the Learning Assistance Center (758-5929) within the first two weeks of class if you require accommodations for taking this course due to a disability.