# Psy 412/512, Fall 2017

CRN 15300/15316 (412/512) 4 credits

**Applied Data Analysis**

| Instructor | Office | E-mail | Office Hours |
|---|---|---|---|
| Jordan Pennefather | 423 Straub | Pennefat@uoregon.edu | Thursday 1-2, and by appointment |
| Sara Lieber | 461 Straub | slieber@uoregon.edu | Monday 1-3 |
| Jennifer Lewis | 432 Straub | jlewis5@uoregon.edu | |

## Course Goals:

This course is designed to sharpen your quantitative and analytical reasoning skills. It should improve your ability to identify patterns in data, relate these patterns to substantive issues about the topic under investigation, and communicate your results and your interpretation in writing. By the end of the course you should be able to:

1. Generate a plan for data analysis that is appropriate to your research questions and the structure of the data
2. Execute your data analysis plan using statistical software
3. Understand and summarize the results of the statistical tests
4. Interpret the results in light of your research questions
5. Clearly communicate what you did, what you think the results mean, and why

**Course Description:** We will cover the concepts and methods of descriptive and inferential statistics at an intermediate level with a focus on correlation and regression as the underlying statistical machinery. Topics include Model development and testing, regression, ANOVA, and ANCOVA. By the end of the course, you will have some level of understanding of each of these methods. The level will vary across topics, which is fine; data analysis training is a lifelong process. This course will be both challenging and rewarding, and will begin you on the path to a theoretical understanding of data analysis and model building.  You will likely not understand every topic perfectly, but that is okay since this is a field which is constantly evolving and we are all still learning.  Be sure to use all the resources that are presented, including your instructors, we are here to help you.

**Learning Adjustments:** The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 164 Oregon Hall, (541) 346-1155 or uoaec@uoregon.edu

**1. Readings.** The primary text we will use for this course is Judd, C. M., McClelland, G. H., and Ryan, C. S. (2009). Data Analysis: A Model Comparison Approach (second edition). This book does a great job of organizing the topics of data analysis. Each chapter builds upon the previous chapters, thus we will follow the book sequentially. You will also be given supplemental reading materials for certain topics. When this is the case, you will be supplied with a PDF of the reading on the course website.

**2. Participation**. Missing class may leave you confused, and missing lab will make it VERY difficult to complete the homework correctly. Do not expect the instructors to repeat material they already presented in class or lab; office hours are best used for review and discussion of material after doing the reading and attending lecture, and for help with homework. Slides from lecture will be posted on Blackboard, but you may want to arrange to share notes with a classmate since much of the material will be presented on the whiteboard and may not be found on the slides.

**3. Homework.** Homework is assigned every week in lab (including the first week, but not the last two weeks), and is due by the start of the first lab (Fridays by 10 am) the following week. All work should be legible and where appropriate typed, with accompanying graphs and data output. There will be some work that is more appropriately written out by hand, including by-hand calculations, formulas, and model descriptions (this will be covered in more detail during lab). All written work should conform to APA 6th Edition style; this style was covered in PSY 303 which is a prerequisite for this class.

Homework will generally consist of a number of "problem sets" which will typically be a combination of hand calculations and analysis using a statistical analysis program. You will also be asked to complete a discussion of the analyses in an APA-style results section. You may work with other classmates currently enrolled in the class to complete the problem set, but **nobody else.**

The entire homework assignment must be *written and produced* by you; you may not copy any other student's words, tables, or statistical output. You should generate your own analyses and write up the results yourself in APA style. If you need further assistance, schedule an appointment with an instructor. Answer keys will not be provided, but common mistakes will be discussed in class. All homework will be submitted electronically.

Late homework: Homework will be accepted up to 4 day late. There will be a 10% deduction per day late (your score multiplied by .9 if one day late, .8 if two days late, etc.)

**4.  Statistical software.**  Use of a statistical software package is necessary for completion of the homework assignments. You may use any software package (for instance, R, SAS, SPSS, Stat-A, Minitab, Excel, etc.) so long as your results are correct and clearly presented (must be able to provide SSE data for entire model). However, the lab for this class will show you how to conduct analyses in SPSS, and support will only be provided for SPSS. SPSS is available on all the computers in the Straub computer lab.

**5. Exams.**  There will be a midterm and a final, both of which are take-home. Yes, there is homework due the week the midterm is due, but the midterm will not include material from that week's homework. The midterm exam will be distributed via email the Friday of week 6 and be due via email the Tuesday of week 6; the final will be distributed on the last day of class and due one week thereafter (during finals week).

**Graduate Students (512)** will have additional requirements to be discussed individually, but typically will include analysis (or planned analysis) of your data.

**6. Grading (approximate):**
Homework assignments: 50% total (lowest will be dropped but all must be turned in)
Midterm: 20%
Final: 30%

**7. Policies**
     *Special Accommodations.* The UO works to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in disability-related barriers to your participation, please notify me as soon as possible. If you have a documented disability, please request that a counselor at the Accessible Education Center ([uoaec@uoregon.edu](mailto:uoaec@uoregon.edu), tel. 541-346-1155) send a letter verifying the type of accommodation that is appropriate. For a list of resources provided by the Accessible Education Center, please see [http://aec.uoregon.edu](http://aec.uoregon.edu).

     *Cheating/plagiarism*. Any form of academic dishonesty, including cheating on exams, copying answers off of other students during exams, having other students help you falsify your attendance, and plagiarizing of any kind will absolutely not be tolerated in this class. I will follow all procedures to handle misconduct as outlined by the University. This means that instances of suspected cheating or plagiarizing will be reported to the University. At the very least, you will receive a zero on the assignment. Please familiarize yourself with the University of Oregon's conduct code, found at [http://conduct.uoregon.edu.](http://conduct.uoregon.edu) You are responsible for behaving in accordance with this policy and continued enrollment in this class will be considered implicit agreement that you have read and accepted the terms of that policy.
     **What is NOT cheating?** Collaborative learning; that is, getting or providing help on the homework. Meeting to compare notes on homework (in person or online) can help everyone do well. Planning a time to sit in the Straub lab to complete and discuss the homework with friends is encouraged! However, don't just copy what someone else has done—complete the homework yourself. Also, do not read or share documents that will actually be turned in! Complete the

homework yourself. For the **final and midterm**, no human collaborators are permitted (but use of books, pre-existing websites, etc. is permitted).

**8. Estimated Student Workload:** When you complete this course, you will earn 4 credits toward your degree. Four credits is the equivalent of 120 hours of work across the term, or 12 hours per week for 10 weeks. You will spend 3 hours in class each week and 1 hour in lab. The other 8 hours will be spent reading, completing homework, and preparing for and completing exams. Homework will comprise the majority of your work outside of class (3-4 hours per week). Readings should take about 2-3 hours per week.  The remaining time will be spent reviewing previous lessons and preparing for exams as well as completing the two take home exams. The workload will be less at the beginning of the term, increasing as you prepare for exams.

**8. Class Etiquette & Norms**
- Arrive on time and stay for the entire class.
- Treat your fellow students and your instructors with respect.
- Turn the ringer off on your cell phone during class.
- Ask questions and speak up during class.
- Stop by and see Jordan, Sara, and Jennifer during office hours.
- Attendance is **not** required; **do not** attend class at all if you cannot meet these norms.

**Tentative Course Schedule:**

|         | **Assigned Readings** | **Topics Covered** |
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| Week 1 | **Preface, Chapters 1-2** | Summary statistics, models and error |
| Week 2 | **Chapter 3** | Definitions of error and parameter estimates. Models of error and Sampling distributions |
| Week 3 | **Chapter 4** | Inference, power, confidence intervals (one-sample t-test and paired/repeated measure t-test) |
| Week 4 | **Chapter 5** | Simple regression (correlation/regression) |
| Week 5 | **Chapter 6** | Multiple regression |
| Week 6 | **Chapter 8** | Independent samples t-test and One-way ANOVA **Mid-Term (Chapters 1-6) Available Friday and due the following Thursday before class** |
| Week 7 | **Chapters 7 and 9** | Interactions and Factorial ANOVA (two-way ANOVA) |
| Week 8 | **Chapter 10** | ANCOVA (models with continuous and categorical predictors) |
| Week 9 | **Chapter 11 (or Topics of Interest)** | Repeated-Measures ANOVA (Nested design and dependent error) |
| Week 10 | **Finish Chapter 11 Review** | Final Exam (Chapters 1-11) |