Public Policy 604 / Political Science 539R
Data Analysis 2 / Econometrics
Course Syllabus
Winter 2013
Lectures: TR 1:30 - 2:50 p.m. 112 SWKT
Labs: T 3:00 - 4:50 p.m. 112 SWKT
R 3:00 - 3:50 p.m. 112 SWKT

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Announcements

I regularly make announcements, clarifications, further instructions, etc., in class and by email. You are responsible for both, even if you do not attend class. You are also responsible for keeping your email up to date at my.byu.edu. I suggest that you exchange phone numbers and/or e-mail addresses with other students in the class.
Office Hours

I will hold office hours on Mondays and Wednesdays 2 - 3 p.m. I am also available at most other times if you make arrangements with me. (Another good time: Thursdays at 11 a.m.) I encourage you to come by to talk about assignments in the class, suggestions for improving the class, politics and current events, the perils of student life, or for any other reason. (Suggested topics: playing the organ, practicing yoga, student evaluations, Choose to Give program, BYU tuition.)

Learning Outcomes

This course explores advanced topics in econometrics, building on basic linear regression learned in Public Policy 603. This course is designed to help you

- Become an excellent consumer of quantitative arguments (particularly statistical arguments).
- Become an excellent regression and statistical analyst, able to utilize statistical techniques and quantitative data to support your own arguments.
- Explain quantitative and analytical results to a regular person.

As a result of its recent accreditation experience (and increasing emphasis from the Department of Education to measure educational outcomes, e.g. NCLB), each program at BYU has developed a set of expected student learning outcomes. These will help you understand the objectives of the curriculum in the program, including this class. To learn the expected student outcomes for the Public Policy Program go [here](#). The specific learning objectives that this course fulfills include:

- conduct extensive background research relevant to a wide range of social problems.
- perform detailed statistical analysis, including multiple regression analysis, and will understand the strengths and limitations of statistical measures in conducting public policy research.
- build analytical models to aid in the policy analysis process, including decision analysis, linear programming and forecasting.
- develop a proficiency in computer software relative to conducting policy analysis, including statistical software and spreadsheets.
- write effectively for different audiences, including elected officials and other policy decision makers, policy analysts, and the public.
• achieve excellence in making oral presentations to different kinds of audiences and master presentation software.

To learn the expected student outcomes for the Political Science Department go [here](#). In the parlance of department outcomes, this course helps you develop the skills of:

• Be intellectually enlarged: Effective research and analysis
• Be intellectually enlarged: Effective and Professional Writing
• Be intellectually enlarged: Critical thinking and analysis
• Have stronger character: Effective Citation

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**Prerequisites**

This is the second semester in a two-course sequence. The first semester was Public Policy 603, and is thus a prerequisite for this course. That course covered basic statistics, ordinary least squares and its pathologies, fixed effects models, and logit/probit models. Econ 388 or PlSc 328 may substitute for PPol 603. If you have not taken one of these courses, you need to speak to me before proceeding.

Students who mastered the material in their prerequisite course will be at an advantage. This course is taught at the graduate-level and demands not only an understanding of the material in the course prerequisites but also the intellectual maturity and dedication required to work through the required readings and assignments at an intense pace. This will likely be the most demanding course you have this semester.

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**Requirements**

A Chinese proverb (supposedly) says, "I hear and I forget, I see and I remember, I do and I understand." This philosophy drives the requirements of the class.

Weekly Assignments 30%
Midterm Exam 15%
Final Exam 25%
Research Project 30%

All assignments are due at the beginning of class. You will most likely turn these in electronically to the TA. **I will not accept late assignments.** The primary reason for
no late assignments is so that we can discuss the assignment in class immediately after it is turned in. If you anticipate a problem with submitting an assignment when it is due, speak to me before the assignment is due so that we can try to work out an alternative arrangement.

**Weekly Assignments**

To understand statistics, you must use statistics. Each week you will be required to complete assignments that will include a variety of activities ranging from statistical theory problems to analyzing data and interpreting statistical results. Part of each assignment is explaining concepts and results to a lay audience. Generally, weekly assignments will be posted on the above link after class on Thursday. (We will record scores on assignments and exams in Gradebook.)

You may work together on these assignments (in groups of two or at most three), but you must write up your answers separately. I give much more detailed instructions on how to report your work together in the Academic Honesty section below. Generally, if you use other persons' work, or make changes to your own work without inquiring or understanding what you did incorrectly, then you are trying to get a grade using someone else's knowledge. Giving or receiving answers in this manner is not permitted in this course. If you do not learn how to analyze or solve problems on your own, you will have difficulty on the exams and research project. Generally, weekly assignments will be distributed and due on Thursdays.

**Exams**

There is a midterm and final exam. These are both take-home exams. They will require you to solve problems similar to case studies in the weekly assignments. You are not allowed to consult with anyone on these take-home exams. The midterm exam is taken home for a week, and is in place of the weekly assignment. (There is no class during the midterm exam.) The final exam will cover material for the whole semester. It will be distributed on the first day of finals, and is due at the end of finals period. Although this is different than most exams taken during the final exam period, the dean has reviewed this plan, and states that it is within university policy.

**Research Project**

Students will write and present a paper on a topic of their choosing. The project will allow you the opportunity to apply the skills that we will develop in this class to actual data and problems. You may pursue any topic of your choice, subject to instructor approval. (One requirement is that you have the necessary data.) As we are spending the most time on multilevel/hierarchical models, a research question that uses such
data would be a good choice. There are a number of deadlines that must be met, noted on the course schedule.

I strongly recommend that you consult with me and the teaching assistant through all phases of your research. I may be able to help you select a feasible topic, find data, or comment on your statistical model.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Date Due</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Proposal</td>
<td>January 31</td>
<td>part of Assignment 3</td>
</tr>
<tr>
<td>Data Summary</td>
<td>February 14</td>
<td>part of Assignment 5</td>
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<tr>
<td>Outline</td>
<td>March 7</td>
<td>part of Assignment 7</td>
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<tr>
<td>Poster</td>
<td>April 2</td>
<td>35%</td>
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<tr>
<td>Paper</td>
<td>April 16</td>
<td>65%</td>
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Proposal

Turn in a 1-2 page, double-spaced proposal (standard font and margins) outlining the research question you plan to address, explains a potential causal connection linking an independent and dependent variable, suggests which econometric model(s) will be used, offers at least 4 relevant citations, and discusses possible data sources to be used.

Data Summary

Turn in a one-page, double-spaced document (standard font and margins) that offers details about the data set that you have obtained. The summary should include summary statistics and any relevant figures that help describe the data.

Outline

Turn in a combination of initial results displayed in tables and figures, including model diagnostics, along with some bullet points interpreting your results.

Poster

Submit and present a poster to the Mary Lou Fulton Conference. Details found here.

Final Paper

The paper's technical level may be higher than the poster. However, you should still explain what your statistical results mean in layperson's terms. You should provide an executive summary. You should also compare the cost effectiveness of any proposed policy compared to next best alternative. (For example, how do helmets compare to
seat belts or speed limits?) In grading the paper, we will consider how well you have used material from the course, how well you have used statistical analysis to test your hypotheses, if the analysis is actually correct (numerical accuracy and correct interpretation), how well you use charts and graphs, logic and organization of the paper, and the usual grammatical and spelling concerns. Follow the examples of published papers we read in class. The papers may be picked up in the Political Science office (745 SWKT) after they are graded.

As a statistical analyst, it is important that you are aware of the limitations of your research. Under what circumstances do your results hold? Likewise, which circumstances would make them invalid? If you are unable to conduct the ideal analysis (perhaps due to resource constraints), explain what the proper approach would be. If you were able to use this superior approach, how would the results likely differ from the results you have?

How to Succeed in this Course

The course is graded on a modified curve. The basic idea is that I will look for natural breaks between students and assign grades accordingly. Thus, I do not assign a set number or percentage of As and Bs.

I will award the higher of two grades:

1. your overall point total
2. your point total using only the final exam and research project

To use #2, you must complete the weekly assignments (Assignment 0 does not count) and the midterm exam. (Turning in a sheet of paper with your name on it is not completing the assignment. Completing an assignment means working on each part of the assignment.) This allows students who take longer to get the material to still do well in the class. However, if you do not work on the weekly assignments, you will not do well on the final exam or research project.

"The expectation for undergraduate courses is three hours of work per week per credit hour for the average student who is appropriately prepared; much more time may be required to achieve excellence" (cite).
"Graduate study is more rigorous than undergraduate study" (cite).
Putting these statements together, the university expects an average graduate student to work more than 9 hours a week in a 3 credit-hour course to achieve excellence. The work load in this course is heavy but manageable.

Students who have succeeded in this course have the following characteristics. They

- Read the material before coming to class.
- Come to class with questions.
- Study in groups to make sure they understand the material.
- Spread work on the weekly assignments across the week.
- Work early and often on their research projects.
- Seek feedback from others.

Lectures and Labs

We will emphasize application and interpretation over theory. Thus, in addition to the textbooks, we will read articles that apply these methods to problems in public policy.

The course will be run primarily as a lecture. In addition, I actively encourage questions and comments germane to our discussion. I urge--indeed, I expect--you to take advantage of the chance to talk with the Teaching Assistant and me during office hours.

On Tuesdays and Thursdays at 3 p.m., there will be a computer lab in 112 SWKT led by the Teaching Assistant.

In the labs you will learn how to do various statistics in Stata. The Stock and Watson website has a helpful tutorial here as well: Stock and Watson Stata tutorial. You will also learn how to do statistics in a couple of other programs to increase flexibility and marketability for future work opportunities. Each week, the lab will cover the commands necessary to do the weekly assignments. The labs will also go over previous weekly assignments and sample exam problems.

You may find it useful to purchase your own copy of Stata. If you do not purchase your own copy, you need to plan ahead to use the computers in SWKT. Since some data sets we use have more than 1000 observations, you will need to purchase Stata/IC or Stata/SE.

Academic Honesty and Plagiarism
From the Academic Honesty section of the BYU Honor Code: "The first injunction of the BYU Honor Code is the call to `be honest.' Students come to the university not only to improve their minds, gain knowledge, and develop skills that will assist them in their life's work, but also to build character. `President David O. McKay taught that character is the highest aim of education' (The Aims of a BYU Education, p. 6). It is the purpose of the BYU Academic Honesty Policy to assist in fulfilling that aim."

"BYU students should seek to be totally honest in their dealings with others. They should complete their own work and be evaluated based upon that work. They should avoid academic dishonesty and misconduct in all its forms, including but not limited to plagiarism, fabrication or falsification, cheating, and other academic misconduct" (cite). Read the full version here.

A colleague (Mitch Sanders, former professor at Notre Dame) has already explicated these issues specifically for political science. Please read here.

If you write a paper for another course (past or present) that uses the same topic as a paper for this course, you need to approve it with me first, and then you must turn in to me a copy of the paper from your other course.

In this class, you need to acknowledge the contributions of others toward your assignments. I have taken the following guidelines from MIT's Unified Engineering class. I have changed and added various words where appropriate:

"The fundamental principle of academic integrity is that you must fairly represent the source of the intellectual content of the work you submit for credit. In the context of [PPol 603], this means that if you consult other sources (such as fellow students, TA's, faculty, literature) in the process of completing homework [(or Stata codes)], you must acknowledge the sources in any way that reflects true ownership of the ideas and methods you used."

"Discussion among students to understand the homework problems or to prepare for [exams] is encouraged."

"COLLABORATION ON HOMEWORK IS ALLOWED UNLESS OTHERWISE DIRECTED AS LONG AS ALL REFERENCES (BOTH LITERATURE AND PEOPLE) USED ARE NAMED CLEARLY AT THE END OF THE ASSIGNMENT. Word-by-word copies of someone else's solution or parts of a solution handed in for credit will be considered cheating unless there is a reference to the source for any part of the work which was copied verbatim. FAILURE TO CITE OTHER STUDENT'S CONTRIBUTION TO YOUR HOMEWORK SOLUTION WILL BE CONSIDERED CHEATING."
"Study Group Guidelines"

"Study groups are considered an educationally beneficial activity. However, at the end of each problem on which you collaborated with other students you must cite the students and the interaction. The purpose of this is to acknowledge their contribution to your work. Some examples follow:

1. You discuss concepts, approaches and methods that could be applied to a homework problem before either of you start your written solution. This process is encouraged. You are not required to make a written acknowledgment of this type of interaction.

2. After working on a problem independently, you compare answers with another student, which confirms your solution. You should acknowledge that the other student's solution was used to check your own. No credit will be lost if the solutions are correct and the acknowledgments is made.

3. After working on a problem independently, you compare answers with another student, which alerts you to an error in your own work. You should state at the end of the problem that you corrected your error on the basis of checking answers with the other student. No credit will be lost if the solution is correct and the acknowledgment is made, and no direct copying of the correct solution is involved.

4. You and another student work through a problem together, exchanging ideas as the solution progresses. Each of you should state at the end of the problem that you worked jointly. No credit will be lost if the solutions are correct and the acknowledgment is made. [You must still write up your solutions individually, not jointly.]

5. You copy all or part of a solution from a reference such as a textbook. You should cite the reference. Partial credit will be given, since there is some educational value in reading and understanding the solution. However, this practice is strongly discouraged, and should be used only when you are unable to solve the problem without assistance.

6. You copy verbatim all or part of a solution from another student. This process is prohibited. You will receive no credit for verbatim copying from another student when you have not made any intellectual contribution to the work you are both submitting for credit.

7. VERBATIM COPYING OF ANY MATERIAL WHICH YOU SUBMIT FOR CREDIT WITHOUT REFERENCE TO THE SOURCE IS CONSIDERED TO BE ACADEMICALLY DISHONEST."

Unfortunately, some BYU students, who have committed to the Honor Code, profess ignorance of or attempt to find loopholes in the previous guidelines. As a result of sad experience, I repeat the following guidelines and add clarifications:
• You may work together on the weekly assignments (in groups of two or at most three), but you must write up your answers separately. Starting with a group document and then giving copies of that document to members of the group is not writing up answers separately, even if individuals make various changes to the original document. You must start with separate, individual answers. If you find yourself emailing or copying files having to do with weekly assignments, you are almost certainly violating this policy. If a group is working on a single computer to conduct analyses, which are then recorded and shared, then the group is almost certainly violating this policy. If you work together on one computer, then you need to wait until you have separate computers to write up your answers. The first time I see group work turned in as individual work (even with "worked with" citations), I will take the number of points earned and divide it by the number of people in the group. The next time, the penalty will be -100% (note: not 0, but -100%).

• As with most textbooks, Stock and Watson has an "instructor solutions manual." You may not use this. It is only possible to get a copy of this through illicit means (e.g. sending money by PayPal to something equivalent to an essay mill, downloading from some BitTorrent site, etc.). If you have a copy of this, you are in violation of the Honor Code, and I will refer you to the Honor Code Office.

• A good shorthand for violating the Honor Code is knowing something is wrong and doing it anyway. Anytime I find a student attempting to deceive me in any way, I will refer that student to the Honor Code Office.

• If you have any questions about these guidelines, please ask me. Do not attempt to exploit loopholes.

Discrimination

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student to student sexual harassment. BYU’s policy against sexual harassment extends not only to employees of the university but to students as well. If you encounter unlawful sexual harassment or gender based discrimination, please talk to your professor; contact the Equal Employment Office at 422-5895 or 367-5689 (24 hours); or contact the Honor Code Office at 422-2847.

Brigham Young University is committed to providing a working and learning atmosphere which reasonably accommodates qualified persons with disabilities. If
you have any disability which may impair your ability to complete this course successfully, please contact the University Accessibility Center (2170 WSC, 422-2767). Reasonable academic accommodations are reviewed for all students who have qualified documented disabilities. Services are coordinated with the student and instructor by the SSD office. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures. You should contact the Equal Employment Office at 422-5895, D-282 ASB.

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**Readings**

All readings should be read before class for full understanding of the subject material.

There are three required textbooks that are available for purchase at the BYU bookstore. (The Stata Press site sometimes has better prices than Amazon.):


The first book (Stock and Watson) was used in PPOL 603 (and PLSc 328). We use this book because it is the least technical textbook that covers the material of the classes. The 3rd edition has some improvements over the 2nd edition, and rearranges some of the material. You could probably get away with using a 2nd edition if you did not mind consulting a classmate's textbook when necessary. Do not use the 1st edition. The book has a web site where you can download data sets and replication files here: [Stock and Watson Student Resources](https://www.StockWatson.com).

The second book (Rabe-Hesketh and Skrondal) is now available in a 3rd edition, which comes in two volumes and costs more. We cover material in both volumes, so we are using the 2nd edition to reduce costs, but you are welcome to use the 3rd edition.

Other articles/chapters:
Here are slides from past lectures:

- January 8

These articles are (mostly) examples of policy analyses that use the methods we are learning:

- Logit model (for review):

- Other instrumental variable articles:


Fixed effects articles (for comparison):

- Another random coefficient model:

• Other hierarchical logistic models:


• Another discrete-time survival model:


Schedule (subject to change)
Note: SW=Stock and Watson; RS=Rabe-Hesketh and Skrondal; CGGM=Cleves, Gould, Gutierrez, and Marchenko

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<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>January 8</td>
<td>Ordered Logit/Probit</td>
<td>SW:A11.3; Baum:10.1-10.2 Ballou and Podgursky</td>
<td>Assignment 0 due</td>
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<tr>
<td>10</td>
<td>Multinomial Logit</td>
<td>Cameron and Trivedi:15.1-15.5 Mitchell</td>
<td>Assignment 1 due</td>
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<td>15</td>
<td>Count Models</td>
<td>Cameron and Trivedi:17.1-17.3.3 Grant and Rutner</td>
<td>Assignment 2 due</td>
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<td>17</td>
<td>Tobit, Sample Selection</td>
<td>Baum:10.3-10.4 Brown and Potoski</td>
<td>Assignment 3 due</td>
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<td>22</td>
<td>Instrumental Variables</td>
<td>SW:12 Gayer</td>
<td>Assignment 4 due</td>
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<td>24</td>
<td>Quasi-experiments</td>
<td>SW:13.5-13.8 Berry, Fording, and Hanson</td>
<td>Assignment 5 due</td>
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<td>29</td>
<td>Time Series</td>
<td>SW:14.1-14.5 Huber</td>
<td>Assignment 6 due</td>
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<td>31</td>
<td>Breaks</td>
<td>SW:14.6-14.8 Lewis-Beck and Alford</td>
<td>Assignment 7 due</td>
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<td>February</td>
<td>Dynamics</td>
<td>SW:15 Carpenter and Rodgers</td>
<td>Midterm Distributed</td>
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<td>5</td>
<td>Cointegration</td>
<td>SW:16 Chinn</td>
<td>Midterm Due</td>
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<td>12</td>
<td>Variance Components</td>
<td>RS:2 Garner and Raudenbush</td>
<td>Assignment 8 due</td>
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<td>14</td>
<td>Random Intercepts</td>
<td>RS:3 Bosshardt and Watts</td>
<td>Assignment 9 due</td>
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<tr>
<td>19</td>
<td>No class: Monday teaching day</td>
<td>RS:4 Goodliffe and Hawkins</td>
<td>Assignment 10 due</td>
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<tr>
<td>21</td>
<td>Random Coefficients</td>
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<td>Assignment 11 due</td>
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<tr>
<td>26</td>
<td>No class: Project Consultations</td>
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<td>Assignment 12 due</td>
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<td>28</td>
<td>Random Coefficients</td>
<td>RS:4 Bloom, Hill, and Riccio</td>
<td>Assignment 13 due</td>
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<td>March 5</td>
<td>Panel/Longitudinal</td>
<td>RS:5 Schmitz</td>
<td>Assignment 14 due</td>
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<td>7</td>
<td>Hierarchical Logistic</td>
<td>RS:6</td>
<td>Assignment 15 due</td>
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<tr>
<td>Date</td>
<td>Activity</td>
<td>Reading Material</td>
<td>Notes</td>
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<td>12</td>
<td>Nonparametric Survival</td>
<td>Bartfeld and Dunifon</td>
<td>Project Outline</td>
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<td></td>
<td></td>
<td>CGGM:1-2,4,8 (5-7 in lab)</td>
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<td>Singer</td>
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<td>14</td>
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<td>CGGM:3,9.1-9.4</td>
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<td>19</td>
<td>Cox Survival</td>
<td>CGGM:10-11</td>
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<td></td>
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<td>Huang, Kunz, and Garfinkel</td>
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<td>21</td>
<td>Parametric Survival</td>
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<td>Assignment 10 due</td>
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<td>Huang, Kunz, and Garfinkel</td>
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<td>26</td>
<td>Parametric Survival</td>
<td>CGGM:13-14</td>
<td>Assignment 11 due</td>
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<td>Garfinkel and Klawitter</td>
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<td>28</td>
<td>Discrete-time Survival</td>
<td>RS:8</td>
<td>Project Poster Due: Noon</td>
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<td>Stinebrickner and</td>
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<td>Stinebrickner</td>
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<td>April 2 Discrete-time Survival</td>
<td>RS:8</td>
<td>Assignment 12 due</td>
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<td>Iceland</td>
<td>Project Paper Due</td>
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<td>RS:9</td>
<td>Final Exam distributed</td>
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<td>Siddiqui et al.</td>
<td>Final Exam due</td>
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<td>4</td>
<td>Count data</td>
<td>RS:10-11</td>
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<td>Nested and Crossed Random Effects</td>
<td>Raudenbush</td>
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<td>11 No class: Poster Session</td>
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<td>16</td>
<td>Review</td>
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