SYA7933/CCJ7742 ADVANCED QUANTITATIVE METHODS
Fall 2013

Instructor
Dr. Robert G. White, Turlington 3356 (rwhite@ufl.edu)
Office hours: Monday 3:00-4:30, Thursday 10:30-12:00 and by appointment.

Meeting Time

Course Description
The objective of this course is to advance students’ training in statistical methods in order to develop a
doctoral dissertation proposal and/or advance ongoing thesis research. The emphasis is in furthering the
skills needed for making substantive inferences from quantitative social data. We will examine empirical
models which are commonly used for working with data which are categorical, collected over time and
measure multiple levels of analysis. The course will begin with generalized linear models for categorical data,
reviewing the foundations of logistic regression and then considering extensions to models for classes of
outcomes which are ordinal, nominal, count and censored. The second section of the course will consider
models for data which display nested structures. Often referred to as multilevel or hierarchical, we will
examine models for repeated measures of individuals over time as well as for data which are nested within
social groups such as regions and organizations. If time permits, the course will conclude with models of
causal analysis including methods using instrumental variables and matching estimators.

Throughout the course we will emphasize practical considerations in applying these different methods. Each
week’s readings will cover the selected methods through theoretical treatments as well as relevant textbook
chapters detailing procedures for implementing models using the Stata statistical software. Periodic data
exercises during the semester will provide additional opportunities for implementing selected models. Our
goal is to learn a collection of empirical methods for working with social data while deepening our
understanding of the foundations of statistical inference.

Prerequisites
This course is the third of a three-course quantitative methods sequence in the Department of Sociology and
Criminology & Law. Successful completion of STA6126 and either SYA6407, CCJ6705 or STA6127 is
required. Please consult me if you have not completed these courses or if you have completed an equivalent
sequence in another department. I will assume students have a solid understanding of the foundations for
ordinary least squares regression and working knowledge of either SAS, SPSS, Stata, R or S-Plus.

Course Requirements
Participation
There are two main components in this course. First, students must fully participate in the course. This
means attending every class. Attendance is an essential requirement for learning the material in the course. I
expect that everyone will attend every class. While there are some health and family obligations which
constitute reasonable excuses for missing a class or exam, the standard for judging whether an absence is
excusable is whether a motivated student would reasonably place the personal consideration before the
academic obligation. If you feel such a situation arises and that you must miss class, please notify me with a
detailed explanation at the earliest possible time before the class you intend to miss.

Full participation in the class also entails arriving to class well prepared to discuss the readings, answer
questions posed by your instructor and fellow classmates and ask questions related to the course material or
your class project. At a minimum, all assigned readings for the class session should be completed before class. Completing the readings requires devoting a substantial period of time to not only reading the assigned selection but also any additional background information that may be necessary for addressing any confusions encountered in the reading. The best preparation further includes reading the supplementary journal articles listed for each class. These articles have been carefully chosen to demonstrate recent state-of-the-art applications for the set of methods reviewed in each class.

Full participation further includes completing the optional homework exercises (discussed below). Although completing these exercises is optional, doing so provides the best opportunity to acquire a deeper understanding of the methods covered in the class. The exercises also provide an excellent opportunity to gain practical experience in using the methods covered in the class. This hands-on training will raise many questions for you, deepen your expertise using your preferred statistical software and well prepare you to make strides in your own research.

Class Project

The second component of the course is completing an empirical project and writing up the results in a polished paper. The project may include any type of quantitative data and empirical method of interest, including empirical methods we do not cover in the course. The chosen data must include real social data. This excludes data which are limited to simulated or non-human phenomena. Your final project will be submitted at the end of the semester in the format of a paper resembling articles published in journals such as *American Sociological Review, American Journal of Sociology, Social Forces, Criminology, Demography* and *American Political Science Review.* The full parameters for the project and my expectations for the quality of the paper are detailed in the attached document.

There are four steps in completing the project.

1. **A project proposal.** The project proposal must be uploaded to the course e-learning website by midnight on the night of 10/6 (look for the assignment called "Proposal"). At a minimum, the proposal must specify the research problem, main hypotheses, the method for the analysis and the data source. While the proposal may also be a draft of the full paper, the main objective of the proposal is for you to receive substantive feedback on the current state of your project. For this reason, the proposal should provide a clear indication of substantial progress and accurately reflect the state of research. The proposal should be written in essay format following the same guidelines for the final paper. An important part of the proposal is a final section entitled "Research Plan" in which you detail the remaining steps of your analysis for completing your project.

2. **A draft of the full paper** is due on 11/3. This draft should include all of the elements which are required in the paper. The draft should demonstrate substantial progress in the empirical analysis and report initial results. A draft that is submitted without initial empirical results will be considered incomplete.

3. **Project presentations** will be scheduled for the final two classes (11/25 and 12/2). I will assign presentation dates midway in the semester. Each presentation will be strictly limited to 15 minutes and will follow the standard format of a conference presentation, with overhead slides and a presumption that the audience is a typical conference audience from the presenter’s field (a random sample of empirically minded sociologists, criminologists or political scientists). Each presentation will be followed by 15 minutes of questions and discussion from class members. Alert attendance and participation of all students is mandatory for these final two classes.

4. **The completed paper** must be submitted by midnight 12/8. It is important that the paper is submitted on-time. Extensions and incompletes will not be possible and requests for extensions will provoke extreme discomfort. Late submissions will suffer a penalty of a partial letter grade per day (e.g., A will become A-).
All due dates are on midnight of the specified day. The final course grade will be based on the following:

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<tr>
<th>Due Date</th>
<th>Assignment</th>
<th>Points</th>
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<tbody>
<tr>
<td>10/6</td>
<td>Project proposal.</td>
<td>10</td>
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<tr>
<td>11/3</td>
<td>Paper draft.</td>
<td>20</td>
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<tr>
<td>11/25 or 12/2</td>
<td>Paper presentation.</td>
<td>25</td>
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<tr>
<td>12/8</td>
<td>Final paper.</td>
<td>45</td>
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Letter grades will be determined by the following:

<table>
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<tr>
<th>Grade</th>
<th>Minimum Points</th>
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<tr>
<td>A</td>
<td>92</td>
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<td>A-</td>
<td>90</td>
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<tr>
<td>B+</td>
<td>88</td>
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<td>B</td>
<td>82</td>
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<td>B-</td>
<td>80</td>
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<td>C+</td>
<td>78</td>
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<td>C</td>
<td>72</td>
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<tr>
<td>C-</td>
<td>70</td>
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<td>D+</td>
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### Optional Empirical Practice Assignments

Periodic empirical exercises will be assigned to provide an opportunity to deepen your understanding of the methods covered in class. There are four assignments which will require estimating the different models covered in the course using publicly available datasets. These assignments are designed to aid your introduction to our course material and assist in furthering your mastery of your preferred statistical software. Although the assignments may be completed in any preferred software, standard routines for estimating all the models covered in this course are available in SAS, Stata and R. For this reason it is strongly recommended that you take this opportunity to advance your skills with one of these softwares. Class readings will include selected chapters for implementing models using Stata. Lectures will also include reviews of the assignments using the Stata statistical software.

### Software

A critical part of our course will be applying methods learned in class to real data. This requires familiarity with either SAS, Stata, R or S-Plus. When course lectures involve statistical software, it will be exclusively limited to Stata. There is no requirement to use Stata. However, your instructor has far greater experience using Stata than SAS and R and will be more resourceful in providing guidance for Stata than for these other softwares.

Stata is available in the sociology graduate student computer lab. Private copies may be purchased through Stata’s “Grad Plan”, available via Stata’s corporate website (http://www.stata.com/order/new/edu/gradplan.html). Although regular (rather than “small”) Stata is recommended, “small” Stata will suffice for completing all course assignments. For the first time at the University of Florida, you now no longer are required to buy Stata or even load it onto your own computer -- Stata is now available for use via the UF cloud. Learn how to access Stata in the UF cloud by visiting http://info.apps.ufl.edu/. Your technology fee paid for this extraordinary new service.

There are many online sources of support for working with Stata. Academic Technology Services at UCLA has a very extensive set of online tutorials for Stata and includes help pages mapping Stata commands to their equivalent commands in SPSS and SAS. The home page for this site is: http://www.ats.ucla.edu/stat/stata/default.htm
Readings

There are no required texts for our class. All required journal articles and book chapters will be made available via the course website on e-learning. Book chapters are selected from the following:

Cameron, A.C. and P.K. Trivedi. 2010. *Microeconometrics Using Stata*. College Station, TX: Stata Press.

Course Schedule

1. 8/26 Course overview and review of multivariate linear regression

**Categorical Data Analysis**

2. 9/9 Generalized linear models, maximum likelihood and logistic regression for binary outcomes.
3. 9/16 Interpretation; hypothesis testing and diagnostics.
4. 9/23 Ordered logit and probit models for ordinal variables.
5. 9/30 Multinomial logit models for nominal variables.
6. 10/7 Censored and truncated categorical dependent variables. Count data.

**Multilevel Analysis**

7. 10/14 Repeated cross-sections, differencing and fixed effects.
8. 10/21 Random intercept models.
9. 10/28 Random coefficient models.
10. 11/4 Centering, testing, explained variance and model specification.
    (Veteran's Day – no class)
11. 11/18 Introduction to growth curves.

**Models for Causal Analysis**

12. 11/25 Matching estimators, instrumental variables and quasi-experimental methods in sociology.

**Student Presentations**

13. 12/2 (Presentation order to be determined.)
Course Policies

- **Attendance.** Class attendance is strongly recommended. It is assumed that you are familiar with all course material and course-related announcements made in class. Class sessions will be devoted to reinforcing the text material and presenting additional material not in the text.

- **Academic Dishonesty.** Academic dishonesty includes: plagiarism; giving or receiving assistance during an exam; falsification, forgery or alteration of academic records or documentation. Any academic dishonesty detected in this course will result, at the very least, in the student(s) receiving a zero on that assignment. Academic dishonesty may also result in dismissal from this course and disciplinary action.

- **Working with other students.** You are encouraged to discuss the course readings with other students during the semester and work together for class assignments.

- **Accommodation.** Students with disabilities who require classroom accommodation must register with the Dean of Students Office. The Dean’s Office will determine the accommodation required. This process must be completed at least one week in advance of the needed accommodation. See http://www.dso.ufl.edu/ for more information.

- **Incomplete Grades.** No "Incomplete" grades will be given in this course. Exceptions to this rule are granted only in the most compelling circumstances. If such a situation arises, students should consult with the instructor at the earliest possible time. Incomplete grades require a standard written contract establishing conditions for completion of the course and a date by which all requirements must be completed.

- **Contacting me.** If you need to email me, email my regular account and put **SYA7933 in the subject line** of the message. If you neglect to do this, I will not receive your email. Do not email me through the online course website. This is a separate email system that I do not use. I normally check and respond to email once daily during normal working hours, Monday through Friday. E-mail is best suited for discussion of simple matters. Please come to office hours if you have a complex question.