Multilevel Models
POS 6933 – Section 136D – Spring 2016
Department of Political Science, University of Florida

Tuesday: Periods 2-4; Room: MAT 051

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Office Hours:

Course Description and Objectives

This course is designed to cover advanced statistical topics for graduate students in political/social sciences as well as other disciplines using applied statistical approaches. The course specifically deals with various topics in what is called as multilevel or hierarchical models. The course assumes that any student taking this course has already been adequately exposed to a one-semester course on advanced linear regression models and a one-semester course on regression models for categorical and limited dependent variables.

The main goal of the course is to encourage the students to acquire a good and working knowledge of how the statistical analysis of data is conducted using multilevel statistical models. The course specifically offers an understanding of how such models work under various conditions. The course also concentrates on studying some of the potential drawbacks and limitations and how we can overcome them. However, due to time constraints, the course must selectively dwell on a limited number of specific models and modifications thereof.

It is my expectation that by the end of the semester, three goals will have been achieved:

(1) students should have improved their already acquired statistical skills in analysing and critically evaluating the quantitative professional literature using hierarchical regression models.
(2) students should be able to design and carry out statistical projects that employ hierarchical modelling techniques for testing substantive theories.
(3) students will become better equipped to explore and study more advanced statistical models and techniques in future projects.

To insure that the class is a hands-on learning experience the course is organized every week in two sessions. One session will consist of a lecture and Q&A of the major theoretical notions and aspects of the course. A second session will consist of a **collective** learning through direct group discussion and practice of the ways on how to use Stata to analyse multilevel data. The second session will be held in the lab room of the political science department. Students are required to attend both sessions and are required to come prepared to effectively participate in both sessions.

Requirements and Evaluation

The requirement for this course is simple: work diligently and persistently. This includes attending classes, doing the readings carefully before the class meets, and working regularly on the homework sets and the research/replication paper. Each student should expect to be spending many hours learning how to excel in using the Stata software commonly used to estimate the models discussed in class.

There will be a number of homework assignments from the Stata book that the students must complete and turn in. The homework assignments are due on specified dates; no late submission is acceptable. In addition, the students are strongly encouraged to solve some of the other exercises at the end of each chapter of the Stata book. This is a good way to put into practice the concepts and techniques learned in each chapter as well as provide yourself with much needed practice to effectively understand and master the learned statistical skills.

A major component of the course evaluation will be a term research replication paper. Each student is expected to produce a manuscript of high quality using an appropriate modelling strategy. I will work closely with the students on their projects.

Distribution of Grades

1. **40%:** Weekly graded sets of exercises from the stata book. All assignments are to be emailed to me before the beginning of class on their respective due dates. No late submission is accepted for any reason (except when justified with university sanctioned documentation).

2. **10%:** Each student will be assigned a "presentation" for the lab session of the course which will consist in presenting one of weekly assigned readings from the stata book (this will be fully explained on the first day of class).

3. **40%**: A Replication Paper chosen by the student in consultation with the instructor. The goal is to produce a high quality manuscript, using a model (or models) discussed in the course. See down below for details.

4. **10%:** Each student will present his/her replication paper at a date and time which will be set by the instructor . The presentation will consist of a ppt presentation for about 10 minutes followed by 5 minutes of Q & A.

Your final cumulative score will be translated into a letter grade according to the following schedule: 93 points or higher = A; 90–92.9 = A-; 87–89.9 = B+; 83–86.9 = B; 80–82.9 = B-; 77–79.9 = C+; 73–76.9 = C; 70–72.9 = C-; 67–69.9 = D+; 63–66.9 = D; 60–62.9 = D-; <60 = E. Information on UF's grading policies is posted at
http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html

Required Reading Materials

1. Sophia Rabe-Hesketh and Anders Skrondal. 2012. Multilevel and Longitudinal Modeling Using Stata. 3rd edition. Volume I: Continuous Responses & Volume II: Categorical Responses, Counts, and Survival. Stata Press. **On reserve at Library West.**

2. Extra readings to be available on convass site for the course in the folder called Files.

Strongly Recommended Reading Materials

1. Stephen W. Raudenbush and Anthony S. Bryk. 2002. Hierarchical Linear Models: Applications and Data Analysis Methods. 2nd edition. Sage Press. **On reserve at Library West.**

2. Andrew Gelman and Jennifer Hill. 2007. Data Analysis Using Regression and Multilevel/Hierarchical Models. Cambridge University Press. **On reserve at Library West.** [Useful introduction to using R for multi-level models]

Computer Requirements

All models covered in this class will be estimated using the Stata software package. It is a must that you have a UF account and password so that you can use the computers in the Anderson datalab. Stata is available on all of the Anderson Hall datalab computers. Alternatively you can use your own computer should you own a copy of stata. You can also use the UF app provided by the university IT department.

Specifics on the Research Paper

In order for the instructors to provide adequate and timely guidance in the preparation of this paper, you will be required to turn in various brief intermediate papers throughout the semester.

Each student must:

- Find a published paper that interests you and that applies a statistical method comparable to the material covered in this course (that is, using a multilevel approach). **Due Date: January 19th – one-page summary of the chosen paper.**
- Obtain the data from the authors (or from elsewhere). **Due Date: February 2nd – one-page report.**
- Replicate the published results as nearly as possible. **Due Date: March 8th – submit a multiple-page report.**
- You **must extend** the analysis in some way. You could, for example:
    - Suggest a more appropriate functional form for the estimation and re-estimate.
    - Argue that one or a set of important variables were omitted and conduct the analysis anew.
    - Argue that the results are likely to be sensitive to sample selection or variable measurement etc. and then conduct appropriate analyses to address that possibility.
    - Extend the data or use a different data set to test the theory.
    - Any other good idea that you might have.
- The final product should be **15-20 pages long**, including the bibliography. **Due Date: April 19th.**
- Prepare a ppt presentation at the exam date and time set by the instructor.

Important Notes:

- The instructor reserves the right to change any part or aspect of this document should a need for doing so emerge at any point in time during the semester.
- Deadline extensions or incomplete grades may be granted under very special circumstances as supported by valid official documentation (in accordance with the university regulations).
- Any student seeking such accommodation must request it prior to the deadline for the specific assignment.
- Retroactive extensions/incompletes will not be granted under any circumstances.
- Online course evaluation process: Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu**.**
- Per university rules there is a zero-percent tolerance on cheating, plagiarism, bribery, misrepresentation, conspiracy, fabrication (see university definitions down below).

- No take-home cooperation with anybody (including your classmates or internet ghosts) is allowed.

UF Policy:

- **University Policy on Accommodating Students with Disabilities:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.
- **University Policy on Academic Misconduct:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at http://www.dso.ufl.edu/students.php.

Legal Definitions

(a) **Cheating** — The improper taking or tendering of any information or material which shall be used to determine academic credit. Taking of information includes, but is not limited to, copying graded homework assignments from another student; working together with another individual(s) on a take-home test or homework when not specifically permitted by the teacher; looking or attempting to look at another student's paper during an examination; looking or attempting to look at text or notes during an examination when not permitted. Tendering of information includes, but is not limited to, giving your work to another student to be used or copied; giving someone answers to exam questions either when the exam is being given or after having taken an exam; giving or selling a term paper or other written materials to another student; sharing information on a graded assignment.

(b) **Plagiarism** — The attempt to and/or act of representing the work of another as the product of one's own thought, whether the other's work is published or unpublished, or simply the work of a fellow student. Plagiarism includes, but is not limited to, quoting oral or written materials without citation on an exam, term paper, homework, or other written materials or oral presentations for an academic requirement; submitting a paper which was purchased from a term paper service as your own work; submitting anyone else's paper as your own work.

(c) **Bribery** — The offering, giving, receiving or soliciting of any materials, items or services of value to gain academic advantage for yourself or another.

(d) **Misrepresentation** — Any act or omission of information to deceive a teacher for academic advantage. Misrepresentation includes using computer programs generated by another and handing it in as your own work unless expressly allowed by the teacher; lying to a teacher to increase your grade; lying or misrepresenting facts when confronted with an allegation of academic dishonesty.

(e) **Conspiracy** — The planning or acting with one or more persons to commit any form of academic dishonesty to gain academic advantage for yourself or another.

(f) **Fabrication** — The use of invented or fabricated information, or the falsification of research or other findings with the intent to deceive for academic or professional advantage.

Getting Help:

For issues with technical difficulties for E-learning in Sakai, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- https://lss.at.ufl.edu/help.shtml

Other resources are available at http://www.distance.ufl.edu/getting-help for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit http://www.distance.ufl.edu/student-complaints to submit a complaint.

Critical Dates:

Classes Begin	January 5
Official University Holidays - no classes	January 18: Martin Luther King Jr. Day February 27 - March 5: Spring Break
ISA 57th Annual Convention – Atlanta	March 15 – 20
Reading Days - no classes	April 21-22
Final Exams	April 23, April 25-29

OUTLINE OF SESSIONS		
Date	**TOPIC**	**Stata Chap.**
1/5	Introduction to the Logic of Hierarchical Models	
1/12	Variance-Components Models Exercises: 2.3, 2.5	2
1/19	Random-Intercept Models with Covariates Exercises: 3.3, 3.5	3
1/26	Random-Coefficients Models Exercises: 4.4, 4.6	4
2/2	Longitudinal and Panel Data: Subject-Specific Effects and Dynamic Models Exercises: 5.5, 5.6	5
2/9	Longitudinal and Panel Data: Marginal Models Exercises: 6.3, 6.6	6
2/16	Longitudinal and Panel Data: Growth-Curve Models Exercises: 7.3, 7.6	7
2/23	Models with Nested and Crossed Random Effects: Higher Level Models with Nested Random Effects Exercises: 8.4, 8.5	8
Spring Break: February 27 – March 7		
3/8	Models with Nested and Crossed Random Effects: Crossed Random Effects Exercises: 9.4, 9.8	9
ISA Convention March 15– 21		
3/22	Models for Categorical Responses: Binary Responses Exercises: 10.5, 10.7	10
3/29	Models for Categorical Responses: Ordinal Responses Exercises: 11.1, 11.4	11
4/5	Models for Categorical Responses: Nominal Responses and Discreet Choices Exercises: 12.1, 12.2	12
4/12	Models for Count Responses Exercises: 13.2, 13.5	13
4/19	Models for Survival Data: Discreet Time Survival Exercises: 14.2, 14.5	14
	Models for Survival Data: Continuous-Time Survival Exercises: 15.2, 15.5	15
	Models with Nested and Crossed Random Effects Exercises: 16.1, 16.10	16