

EDF 5401

General Linear Models

Spring 2010

Department of Educational Psychology & Learning Systems

Florida State University

<p>Instructor: Mustafa Kuzey Bilir, Ph.D.</p> <p>Class hour: T/R 11:00am-12:45pm</p> <p>Class room: STB G154</p> <p>Office: 3204J Stone Building</p> <p>Email: kbilir@fsu.edu</p> <p>Office hours: W 3:30-5:00 pm R 1:00-2:30 pm or by appointment</p>	<p>TA's office: STB3207- Christine Ouma (co09f@fsu.edu) LRC 1302B-Jina Choi (jc04s@fsu.edu)</p> <p>Office hours: Christine Ouma: T 1:00pm-2:30pm Jina Choi: M : 10:30am-1:00pm T : 8:30am-11:00 am W: 12:00pm-2:30pm R: 8:30 am-11:00am Seung-Jin Lee:TBA</p>
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Prerequisite: EDF 5400 Basic Descriptive and Inferential Statistics Applications

Course Description

This course introduces students to techniques of data analysis and statistical inference based on the general linear model. The bulk of the course is devoted to linear regression analysis of continuous outcomes. In addition techniques for logistic regression (for dichotomous and categorical outcomes) are covered. Students will conduct analyses using the NELS:88 data base and other data sets, with SPSS.

Knowledge of basic algebra is required, as an understanding of the fundamental principles of descriptive statistics and hypothesis testing (as taught, for example, in EDF 5400 or equivalent). Knowledge of calculus is not required.

In most of our analyses we will use samples drawn from a real, large-scale study of education. The NELS:88 (National Education Longitudinal Study of 1988) data base is one of the largest and most important collected by the U.S. government, including extensive measurements of students' beliefs, aspirations, attitudes, and background, as well as related information from teachers, parents, and schools. SPSS will be used as the software for the analyses.

Textbooks

Required textbook(s)

1. Howell, D.C. (1997). *Statistical Methods for Psychology* (5th, 6th or 7th ed.). Pacific Grove, CA: Duxbury.
2. Fox, J. (2008). *Applied Regression Analysis and Generalized Linear Models*. (2nd ed). SAGE Publications, Inc.

Recommended textbooks

1. Lewis-Beck, M. S. (1980). *Applied regression: An introduction*. Sage Publications.
2. Fox, J. (1991). *Regression Diagnostics: An introduction*. Sage Publications.
3. Menard, Scott (2002). (2nd). *Applied Logistic Regression Analysis*. Sage Publications.
4. O'Connell Ann Aileen. (2005). *Logistic Regression Models for Ordinal Response Variables*. Sage Publications.
5. Pedhazur, E. (1997). *Multiple Regression in Behavioral Research*. (3rd ed). Thomson Learning.

Course Objectives

By the end of the course the students should have demonstrated the ability to:

1. Identify continuous and discrete (or categorical) variables as either dependent or independent, and choose appropriate statistical procedures for their analysis;

2. Describe relationships between predictor variables and a continuous outcome variable;
3. Calculate point estimates, confidence intervals and hypothesis tests for regression slopes;
4. Delineate assumptions of linear statistical models and examine data to evaluate their conformity to those assumptions;
5. Formulate and interpret multiple regression models appropriate for various research problems and interpret computer output relevant to those models;
6. Recognize similarities and differences between regression and analysis-of-variance models;
7. Describe relationships between predictor variables and a dichotomous outcome variable via binary logistic regression;
8. Calculate and interpret regression parameters for binary logistic regression models;
9. Conduct analyses to diagnose problems with multicollinearity, influential points, etc., for binary logistic regression;
10. Formulate models for multi-category outcome logistic regression models;
11. Interpret output from multi-category logistic regressions;
12. Write coherent summaries and interpretations of data analyzed by the above procedures.

Course website and e-mail

A course website has been set up through the Blackboard (Bb) System. Lecture notes (mostly .pdf versions of PowerPoint files), assignments and other resources will be available from this web site. As needed, course-related announcements will be posted on the course website. By default, only announcements posted the same day are displayed on the opening page. Therefore, get in the habit of clicking on the tab within the announcements page that displays announcements posted during the last 7 days.

Any course-related e-mail that I initiate will be sent to your e-mail address listed on the Blackboard system (this is usually your garnet account, by default). If you don't check your garnet mail often,

please set up a preferred alternate address on the Blackboard system or arrange automatic forwarding service from your Garnet account to a preferred alternate address.

Grades

Grades will be based on points accumulated on assignments and examinations. There will be 100 total possible points, distributed as follows:

Homework assignments (4 HW)	40% (10% each)
Midterm exam (scheduled time only)	30%
Final exam (scheduled time only)	30%

Grading Scale		
Lower%	Upper%	Grade
93.00%	100.00%	A
90.00%	92.99%	A-
87.00%	89.99%	B+
83.00%	86.99%	B
80.00%	82.99%	B-
70.00%	79.99%	C
60.00%	69.99%	D

Assignments

- Four assignments will make up the points devoted to homework.
- Always submit your output with your homework.
- Total homework points will be converted to a percentage score, then weighted and combined with exam scores to obtain a final overall grade.
- Homework assignments **must be** submitted in groups of **two or three** – each team of students should turn in a single copy of the group homework with both names listed. However, answers

MUST be written independently from students in other groups. Any violation to this requirement, including exchanging answers, will be considered as violation of the Academic Honor Code of FSU.

- **If you would like to appeal any grade on your homework you must make the appeal in writing to our teaching assistant. You must wait at least one day after the homework has been returned to you.**
- Each student is given a total of 4 late days (including weekend) that can be used throughout the semester without any consequence to the final grade. The first late day begins immediately after students have been asked for the assignments to be turned in class. **If assignment is turned in after the class period of time, it will be counted to be 1 late day.** You may use one late day on each assignment, or all 4 days on one assignment. If more than 4 late days are accumulated, it will affect your final course grade, as described below. One exception is that **NO POINTS** will be given for any homework turned in after answer sheets are distributed.
- If the total number of late days accumulated exceeds 4, grade will be affected in the following way:

Number of late days	Consequences
5 – 7	Final percentage grade reduced by 5 points (e.g., 100 points to 95 points)
8 - 10	Final percentage grade reduced by 10 points (e.g., 100 points to 90 points)
11 or more	Possible failure.

Late Homework

- Late homework should be first turned in electronically via e-mail both to me and Christine Ouma. The late days will be counted based on the date and time of your received electronic submission. A hardcopy of the late homework have to be submitted in person at the next class session

Electronic Submission

- You can submit your homework electronically via e-mail to me and to the TA. However, you have to submit a hardcopy for your homework to be graded.

Note: You are responsible for obtaining materials in case you are absent in a class.

Exams

The midterm exam will be taken at a regular class time within the semester. Final exam will be taken at the regular class time on Thursday 4/22. Both midterm and the final exam are open-book and open-note, and on both exams you will need to use calculators. However, books, notes, and calculators may NOT be shared during exams, so be sure to bring your own materials!!

Software Use

This course will require the use of SPSS. SPSS is general statistical package software and available on many lab computers on campus, including LRC lab in Stone building.

Honor Code

Students at FSU are expected to uphold the Academic Honor Code published in The Florida State University Bulletin and the Student Handbook and found online at <http://dof.fsu.edu/honorpolicy.htm>. The Academic Honor System of The Florida State University is based on the premise that each student has the responsibility (1) to uphold the highest standards of academic integrity in the student's own work, (2) to refuse to tolerate violations of academic integrity in the university community, and (3) to foster a high sense of integrity and social responsibility on the part of the university community. Academic dishonesty, including copying and plagiarism, may result in failure of this course.

Students with Disabilities

Students with disabilities needing academic accommodation should (1) register with and provide documentation to the Student Disability Resource Center; and (2) bring a letter to your instructor indicating the need for accommodation and describing the type of accommodation needed. This should be done during the first week of class.

Schedule (subject to change)

Week	Topic	Date	Reading (Assignments
1	Introduction (syllabus & intro to regression)	1/7	Fox:1,3 (pp.26-43) Howell 1-4	
2	Simple regression	1/12	Fox:2,	
		1/14	5 (pp.77-86),	
3		1/19	6 (pp.100-105)	
		1/21		
4		1/26	Howell: 9 (9.1-9.8, 9.10-9.14) Green book #22 (pp.1-36)	
	Multiple regression	1/28	Fox:	
5		2/2	5 (pp.86-99),	HW1
		2/4	6 (pp.105-115),	
6		2/9	11,12, 13 (F:323-330)	
		2/11	Howell: 15 (15.1-15.10,15.12-15.14)	
8	Dummy, interaction,	2/16	7, 8	

	and relation to ANOVA	2/18		
7		2/23	Review Sheet	Hw2 due
	Midterm	2/25		Midterm
9	ANCOVA and ATI models	3/2	Handouts	
		3/4		
	Spring Break	3/9-11		
10	ANCOVA and ATI models (cont.)	3/16	Handouts	
		3/18		
11	Nonlinear	3/23	4, 17	Hw3 due
		3/25		
12	Logistic_dummy	3/30	14	
		4/1		
13		4/6		
14	Logistic_categorical	4/8		
		4/13		
		4/15		
15	Review for Final	4/20	Review Sheet	Hw4 due
	Final Exam	4/22		Final Exam
Final Exam is scheduled at 11:00am-12:45pm on April 22, Thursday				