

Instructor

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Office Hours

Tuesday 2:00 – 3:00pm, or by
appointment

Required Textbook

Pedhazur E.J. (1997). *Multiple Regression in Behavioral Research* (3rd edition). New York: Harcourt Brace College Publishers.

Additional Reference Textbooks

Agresti, A., & Finlay, B. (1997). *Statistical Methods for the Social Sciences* (3rd ed.). Upper Saddle River, NJ: Prentice Hall. (Novice to intermediate)

Cohen, J., Cohen, P., West, S. G., Aiken, L. S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates. (Moderately advanced)

Hinkle, D.E., Wiersma, W., & Jurs, S.G. (2003). *Applied Statistics for the Behavioral Sciences, Fifth Edition*. Boston, MA: Houghton Mifflin. (Novice to intermediate)

Howell, D. C. (2002). *Statistical Methods for Psychology* (5th ed.). Pacific Grove, CA: Duxbury Press. (Intermediate)

Glass, G. V. & Hopkins, K. D. (1984). *Statistical methods in education and psychology* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall. (Moderately advanced)

Hays, W. (1999). *Statistics* (5th ed.). New York: Hot, Rinehart, & Winston. (Advanced)

Neter, J., Kutner, M. H., Nachtsheim, C. J., & Wasserman, W. (2004). *Applied linear statistical models* (5th ed.). Chicago: Irwin. (Advanced)

Course Description

Multiple regression is a highly general and therefore very flexible data analytic framework in which to examine phenomena naturally occurring in the behavioral sciences (i.e., motivation, anxiety, aggression, achievement, and so on). At its core, multiple regression analysis is used to model the relationship between a dependent variable and factors of interest, the independent variables. This semester we will examine quantitative as well as qualitative dependent variables, continuous and categorical independent variables, and uncorrelated and correlated errors. The course builds on topics which were introduced in EDMS 645 and 646 including: descriptive statistics and graphs, basic sampling and hypothesis testing, two-group mean comparison, simple analysis of variance (ANOVA), multiple comparison procedures, factorial ANOVA designs and repeated measures. *Note that students who have not had the necessary prerequisite coursework should not take EDMS 651.* Explicit in the course title is the word “applied,” meaning that course material will be presented to facilitate your conceptual understanding of fundamental statistical methods typically employed in educational and psychological research settings. This does not mean that underlying statistical and mathematical theory will not be presented; it just won’t be the focal point of the course. Technical aspects of analyses will be presented and stressed as the material warrants.



Course Delivery

I will be using my own course website to delivery materials for the course, including class notes, data sets, ancillary materials, extra readings, etc. You can access the course website at

<http://www.edms.umd.edu/EDMS/fac/Harring/EDMS651.html>

You will find navigation buttons to access course materials. You will be asked to provide your *Username* (Directory ID) and a *Password*. If you have difficulty logging in there please contact me as soon as possible.

Prior to coming to class each week, students are to print out and bring with them the lecture notes for that week's class. Please follow the syllabus for topics and dates. Materials should be posted by the morning on the day of class. If they are not, please don't fret. I will make copies of the notes and bring them to class for you.

Statistical Software

You will need *Adobe Acrobat Reader* (<http://www.adobe.com/downloads>) to read and print most of the course materials. This program is free and comes already installed on most new computers. You may also want to install *Java* on your computer (<http://java.sun.com/>). This will allow you to open any web applets that we may use in the course. You will also need access to a statistical package such as *R*, *SAS*, or *SPSS*. You may use any software that you are familiar with, but the course will focus on *SPSS* with some *R* examples. Both *R* and *SPSS* are available to use in the Benjamin building basement computer lab (0230). *R* is free and can be downloaded at

<http://www.r-project.org/> → [CRAN mirror](#)

Examples in class will come from both *R* and *SPSS/Windows* (14.0 & 15.0). Students may use whichever recent package they wish, but they should know that slight differences may exist between what I present and the options available on their chosen version. There are three possible courses of action for using *SPSS*...

- Option 1: Buy nothing. Use a campus lab to do *SPSS* for this class.
- Option 2: Buy a version of the Student/Ware package, which include a manual and should get you through EDMS 651, except for repeated measures. This has **limited** data management capabilities and statistical packages. Cost is less than \$100 at the UMD bookstore.
- Option 3: Buy a version of the GradPack, which historically costs between \$225 and manuals must be purchased separately. This is for the student who plans to take more quantitative classes beyond EDMS 651, and/or who plans to conduct serious quantitative research (e.g., a dissertation).



Course Topics and Readings

Below is a list of topics and readings we will cover throughout the semester. I provide a more detailed calendar below; however, I am not sure how long topics will take to cover in class, and therefore the schedule may be modified. Students should keep up with the readings whether or not the material is explicitly covered in class or not.

Topics	Readings	Pages
Simple linear regression and correlation	EDMS 645 & 646 text	
	Pedhazur	15-41
Regression diagnostics	Pedhazur	43-59
Multiple regression: Two independent variables	Pedhazur	95-133
Statistical control: partial and semi-partial correlation	Pedhazur	156-193
Prediction	Pedhazur	195-238
Analysis of effects	Pedhazur	283-296; 298-338
Categorical independent variables	Pedhazur	340-360; 405-407
Multiple categorical predictors: factorial designs	Pedhazur	410-430; 441-456
Continuous and categorical independent variables	Pedhazur	560-574; 628-672
Nonlinear response functions	Pedhazur	513-535; 547-558
Categorical dependent variable: logistic regression	Pedhazur	714-715; 748-761

The calendar below lists the dates of the lecture topics and the due dates for the homework assignments and the exams.



Session	Date	Topic	Due Date
1	29-Jan	Course Overview; Correlation; Linear regression	
2	4-Feb	Multiple Regression: two predictors	Homework 1
3	11-Feb	Multiple Regression: two predictors	Homework 2
4	18-Feb	Regression Diagnostics	
5	25-Feb	Partial Associations	Homework 3
6	3-Mar	Multiple Regression: many predictors	
7	10-Mar		– Midterm Exam –
8	17-Mar	Spring Break	
9	24-Mar	No Class: AERA Conference	
10	31-Mar	Categorical Predictors; Interactions; Moderators	Homework 4
11	7-Apr	Categorical Predictors; Mediators; Curvilinear Effects	
12	14-Apr	Logistic Regression: Introduction	Homework 5
13	21-Apr	Logistic Regression	
14	28-Apr	Maximum Likelihood Estimation	Homework 6
15	5-May	Models for Correlated Errors	
16	12-May		– Take Home Final Exam –

*Due dates may be altered based on the pace of the class.



Formal Course Assessment

Homework Assignments

There will be several assignments spaced evenly throughout the semester, each designed to give students an opportunity to apply and practice concepts learned in class. It is expected that students will be using *SPSS* (or *R*) for their homework where computer work is required. In working the assignments, you are expected to pull together the material from lecture, the text, and the supplemental notes where applicable. Late homework assignments **will not** be accepted. Also, homework **cannot** be submitted via email. Graded assignments will generally be returned within two days after they are submitted. **Students are encouraged to work in groups on homework and to turn in a single homework with the names of the group members (maximum of 4 students per group). It should be understood that all members of a group receive the same score on homework completed together.** You may wish to keep a photocopy or at the very least save assignments electronically for your own protection. Assignments are due upon entering the class on the specified due date.

In the assignments students should cut and paste relevant portions of the computer output into the appropriate places in your homework to show how you arrived at your solution. Students **should not** write, “See p.86 of the attached computer printout to see where I got my answer.” Assignments should be well-organized and free from spelling, grammatical, and punctuation errors. Finally, all assignments **must be** word-processed. You will need to use Microsoft Equation Editor 3.0 or similar software to incorporate any mathematical notation and symbols into your documents. This package is located in Microsoft Word and can be accessed within the document: INSERT → OBJECT → Microsoft Equation 3.0.

Exams

There will be an in-class midterm exam (date to be determined) and a final take home exam. The content of the midterm exam will cover topics presented in class up to that point. The midterm exam will be closed book and closed class note; however, students may prepare and use up to two 8.5”x11” two-sided pages of notes. Students should bring a calculator to the exam; and note the sharing of calculators between students will not be allowed. Unlike the homework, the final exam will be completed by **you** alone, without the aid of discussing the questions and solutions with other classmates, students outside the class or faculty. Students are on their honor to do exams completely independently; **any student found doing otherwise will be subject to the maximum University penalties.**



Course Grades

This course is not graded on a curve. Your homework and exams will be combined using a weighted average grading scheme with the corresponding weights given below. Final letter grades will then be assigned based on the given scale (there will be no rounding).

Assessment	Weight	Overall Course Percent	Grade
Total homework points converted to a percentage	60%	98.00% — 100.00%	A+
Total midterm exam points converted to a percentage	20%	92.00% — 97.99%	A
Total final exam points converted to a percentage	20%	88.00% — 91.99%	A-
		85.00% — 87.99%	B+
		82.00% — 84.99%	B
		78.00% — 81.99%	B-
		75.00% — 77.99%	C+
		72.00% — 74.99%	C
		68.00% — 71.99%	C-
		65.00% — 67.99%	D+
		62.00% — 64.99%	D
		58.00% — 61.99%	D-
		≤ 57.99%	F

Unless a computational error has been made, grades will not be changed after the end of the semester. Please do not come to my office with “extenuating circumstances” for why your grade should be changed.

No Extra Credit

Your course grade will be based only on the above assessments. There will be **no** extra credit opportunities. Please do not ask for exceptions.

Incompletes

Incompletes for this course will be given on a case-by-case basis. However, unless the student can demonstrate the near catastrophic events have led to a case of extreme hardship, grades of “incomplete” will not be given for this course. Incompletes **will not be given** for poor performance in the course.

Accommodations for Emergencies

In the event that the University closes on the day of class (for instance, a huge hurricane rips through the campus), we will obviously have no class. However, if the University does not shut down and there is a threat of inclement weather, etc., we will still have class unless you hear from me otherwise. With that said, please check your email and/or the course website on blackboard, sometime during the day of class for any last minute postings of announcements regarding the course. If you need to be gone from class, out of common courtesy I would appreciate if you would send me an email to let me know. All students are expected to take the exams and/or submit assignments on the specified dates and no make-up exams are planned (see section on make-up exams below). You must contact me before an exam if you are going to be absent or you will receive a zero for that assessment.



Academic Accommodations

In compliance with and in the spirit of the Americans with Disabilities Act (ADA), I want to work with you if you have a documented disability that is relevant to successfully completing your work in this course. If you need academic accommodation by virtue of a **documented disability**, please contact me as soon as possible to discuss your needs. Students with documented needs for such accommodations must meet the same achievement standards required of all other students, although the exact way in which achievement is demonstrated may be altered. All requests for academic accommodations should be made as early as possible in the semester. For further information concerning disability accommodations can be obtained at the Disability Support Service – (301) 314-7682.

Academic Integrity

The University of Maryland, College Park, has a nationally recognized “Code of Academic Integrity,” administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible to uphold these standards for this course. It is imperative that you are aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the code of Academic Integrity or the Student Honor Council, please visit → <http://www.studenthonorcouncil.umd.edu/code.html> for details.

On plagiarism -- It is important that the student synthesize pertinent information from the readings and class lectures when writing up homework assignments. Synthesis does not occur when large blocks of text are copied from the textbook or my notes and used to answer questions. It is understood that the student will have to use some verbatim phrases and definitions from the textbook or notes. This is not considered a case of scholastic misconduct. For example, a textbook may have a sentence reading “The mean of the IQ distribution is 101.” If your SPSS output indicates that $\bar{y} = 101$ and you are asked to provide the mean of the IQ distribution, it is perfectly lawful for you to write “The mean of the IQ distribution is 101.” What must be avoided is extensive verbatim copying of information from the textbook or my notes when answering the longer questions on the assignments.

Make-Up Examinations

The University policy states: “An instructor is not under obligation to offer a substitute assignment or to give a student a make-up assessment unless the failure to perform was due to an excused absence, that is, due to illness (of the student or a dependent), religious observance (where the nature of the observance prevents the student from being present during the class period), participation in university activities at the request of university authorities, or compelling circumstances beyond the student’s control. Students claiming excused absence must apply in writing and furnish documentary support for their assertion that absence resulted from one of these causes.”

