

ED PSY 820: Multiple Regression and Other Linear Models

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Office hours: By appointment; please contact me by e-mail to set up a time to meet as necessary.

This course is designed to provide students with a solid overview of basic and advanced topics in regression analysis. The course will be taught from an applied perspective, and the objectives are to enable students to:

- Identify the most appropriate analysis for research questions and data sets suitable for regression models.
- Use statistical software to appropriately carry out the data analysis and interpret the statistical information.
- Clearly communicate the results of the statistical analyses to address the research questions of interest.

By the end of the course students should be able to identify the regression analysis most appropriate for a given research question and data set, carry out the analysis and properly interpret the results. Students will be exposed to regression models and analyses that they may need to use in their own research or encounter in reading research articles.

COURSE WEB PAGE: This course has a **D2L site** associated with it that students should check on a regular basis.

The site can be accessed at <http://d2l.uwm.edu/> and will contain class notes, assignments, links, and any other course information. Notes for each week will be posted on D2L prior to class, and **students are encouraged to bring the notes to class**. Instructions for using D2L are available at <http://uwmltc.org/?p=870>.

PRE-REQUISITES: A graduate-level statistics course such as ED PSY 724 that included factorial ANOVA, simple (and possibly multiple) regression, and statistical computing.

TEXTBOOK:

- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression / correlation analysis for the behavioral sciences*, 3rd ed. Mahwah, NJ: LEA. *It might help to bring the book to class!*
- Other readings and (optional) books will be listed on the course web site.

COMPUTING: A basic calculator may be useful for in-class and homework assignments. Students will be required to use a statistical software program (such as SAS or SPSS) and are expected to **already be proficient** in at least one such program. In-class emphasis will be on demonstrating the use of SAS. Students who wish to use other software packages are welcome to do so on their own.

COURSE STRUCTURE AND STUDENT EVALUATION:

- **Homework:** Homework problems will be assigned every week and collected approximately every 2-3 weeks.

Assignments and due dates will be **posted on the course web page** on a **weekly basis** and you are strongly encouraged to do the problems each week and not leave them until they are due. The homework is intended to give you hands-on practice with the concepts we cover and to ensure that you are keeping up with the material. Each problem will be graded on a three-point scale to indicate the level of accuracy and understanding reflected in your answer:

Points	Interpretation
3	Complete, clear and correct.
2	Some mistakes and/or misconceptions, somewhat unclear or incomplete.
1	Many mistakes and/or misconceptions, very unclear or incomplete.
0	Not done or barely attempted.

You need to make sure that you are clearly communicating your **own** understanding in your answers (see also the General HW Guidelines document on D2L). Homework grades and comments are designed to provide you with feedback on the level of understanding reflected in your answers. If you find the feedback insufficient, it is **your responsibility** to make sure you understand how to improve (and ask for help as needed). Late homework assignments will be accepted with a **10% point deduction** for each day they are

late, including weekend days (in other words, you will lose 10% of the total number of points for the assignment for each day it is late). It is your responsibility to turn your homework in on the due date (even if you are absent)! In addition, each student is expected to submit his or her own **independent** work. While you are allowed to discuss the concepts on homework assignments, **the work you hand it must be your own** and it is considered academic misconduct to submit anyone else's work (or words) as your own.

- Exams: There will be one midterm exam as well as a final exam. These will be take-home exams and must be submitted by their due dates. Students cannot discuss or collaborate on the exams with anyone and are expected to complete these exams independently and with the utmost regard for academic integrity.

There will be NO extra credit option in this course.

The weights assigned to each of the three components will be:

Homework	25%
Mid-term exam	35%
Final exam	40%

Using these weights, final scores (out of 100) will be computed and these will be converted to letter grades as follows:

A 90-100	A- 85-89	B+ 80-84	B 75-79	B- 70-74	C+ 67-69	C 63-66	C- 60-62	D+ 57-59	D 53-56	D- 50-52	F below 50
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UNIVERSITY POLICIES: General policies are available at <http://uwm.edu/secu/wp-content/uploads/sites/122/2016/12/Syllabus-Links.pdf>. Please review these at the start of the course.

TIME INVESTMENT: This will vary by student and by week, but my expectation is that students will spend (in addition to time attending lectures) about 3 times the in-class time on readings and assignments, for a total of about 150 hours. Please click [here](#) for a more detailed breakdown. This is an estimated workload and students will be assessed on their performance (as indicated in the syllabus), not on the time put into the course

A note about cell phones: As a courtesy to the instructor and your fellow students, *please turn OFF your cell phone ringer* during class.

TENTATIVE SCHEDULE

Week	Date	Topic	Reading
1	Sept. 6	Introduction & Review of Correlation and simple regression	Chapter 1-2
2	Sept. 13	Descriptive multiple regression: two-predictor models	Sections 3.1 - 3.4
3	Sept. 20	Inference in multiple regression models	Sections 3.5-3.8
4	Sept. 27	Formulation of multiple regression model: a brief introduction to matrix algebra	Appendix &TBA
5	Oct. 4	Assumptions of regression analysis	Chapter 4
6	Oct. 11	Diagnostic measures: Outliers and multicollinearity	Chapter 10
7	Oct. 18	Data analytic strategies: variable sets and comparisons Midterm Exam handed out	Sections 5.1-5.7
8	Oct. 25	Data analytic strategies, continued	Sections 5.1-5.7
9	Nov. 1	Nonlinear regression	Chapter 6
10	Nov. 8	Interaction between continuous predictors	Chapter 7
11	Nov. 15	Categorical independent variables	Chapter 8
12	Nov. 22	~ Thanksgiving break ~	
13	Nov. 29	Interaction between categorical and continuous variables	Chapter 9
14	Dec. 6	Mediation models Final Exam handed out	Sections 12.1-12.3
15	Dec. 13	Introduction to logistic regression	Section 13.2

Note: The due date for each exam is anticipated to be two weeks from the day it is handed out.