SW 9300: Applied Regression Analysis and Generalized Linear Models
(3 Credits)
Winter 2013: Wednesdays 4:30-7:15

School of Social Work
Challenging Minds, Leading Change, Transforming Lives

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Office Hours: Wednesdays 3:00 - 4:00 pm and by appointment.

I. COURSE DOMAIN AND BOUNDARIES

This is the second required course in the research methods sequence for social work doctoral students. The course builds upon the concepts and procedures introduced in Social Work 9100: Social Statistics & Data Analysis. This course will provide an overview of multivariate statistical procedures including multiple regression, logistic regression, multivariate analysis of variance, factor analysis and principal components analysis. The primary focus of the course is on using the SPSS statistical package for calculating multivariate statistics and the utilization of the statistical output in research findings.

At the end of this course, students will be able to apply an array of multivariate models to analyze data relevant to a wide range of policy and practice issues within the field of social work. Students will learn how to choose the appropriate statistical tests for research problems, how to use diagnostic measures to examine and address statistical models, how to conduct analyses using SPSS, how to interpret findings, and how to communicate their results clearly and effectively to both scholarly and social work practice audiences. Students will also learn the mathematical underpinnings of these statistical models.
Prerequisite: SW 9100 Social Statistics and Data Analysis or equivalent.

II. KNOWLEDGE AND SKILL OBJECTIVES

By the end of this course, the student should understand:

1. How the analysis of data derives from the statement of a research problem or hypothesis and the availability of empirical data.
2. How to choose and apply appropriate multivariate techniques to address research questions and hypotheses
3. How to use diagnostic assessments and remedial measures to address violations of statistical assumptions in the multivariate model;
4. How to use SPSS to conduct multivariate analyses with quantitative and qualitative predictors and outcome variables;
5. How to interpret the results of statistical analyses;
6. How to communicate statistical findings clearly and effectively, using APA format;
7. How to recognize strengths and weaknesses in multivariate analyses.
8. How to design a data analysis strategy that answers a research question or hypothesis;

III. ORGANIZATION OF THE COURSE

Course content will be covered using class lecture, focused discussions, lab sessions, and regular homework assignments involving data analysis exercises and computer applications. Students are encouraged to seek clarification and greater understanding of the material presented during class by asking questions, sharing their experiences and participating in discussions. While most statistical calculation will be done on the computer, some hand calculation is inherent in statistical analysis. Cell phones or laptop computers (e.g. calculator or Microsoft Excel) can be used to compute these calculations. Course materials including the syllabus, homework

assignments, and datasets will be made available through Blackboard. Course announcments and updates will also be made through Blackboard.

If you have any questions or need to request help, send me an email. Usually you may anticipate a response within 24 hours. My email address is listed at the top of this syllabus. If I think your question is of general interest to the class, I may post it as an announcement unless you explicitly request that I do not post it (note: I generally do not specify the person who asked the question). If you need to meet with me individually, the best method for scheduling an appointment is via email.

IV. Role of the Students

It is expected that students will attend class, where many topics are stressed or explained in better detail than the text offers. "Showing up" is just the beginning of class participation. As part of class participation, students are expected to do all the assigned readings, reflect upon them, and be prepared to engage critically and constructively in the issues presented. Students are expected to contribute to class discussions, share their responses to course readings and topics raised in class, ask questions and completing all assignments in a timely fashion. Failure to attend class will likely hurt your chances of receiving a high grade in this class. In addition to attending all class sessions, students should make every effort to arrive at class on time. Students who arrive late miss important information and disturb their classmates. There may be occasions when students will not be able to attend class because of illness or other personal problems. In such cases, it would be appropriate for the student to notify the professor. In the case of excessive absences, the professor reserves the right to deduct points from a student's final course grade.

V. PERFORMANCE CRITERIA

Two data projects, one exam and regular homework assignments are required for this class. The data projects are "take-home" assignments that require students to perform data analyses using SPSS, present the findings using APA format, and interpret the results. Secondary data sets will be provided for the assignments by the instructor. However, students may obtain permission from the instructor to analyze their own data for the second paper. Although students are permitted to work together on the analysis for the data papers, it is expected that the text of the papers will be written independently. While it is also permissible to use a tutor for help with these assignments, you must inform the instructor if you are using one and the nature of the assistance they are providing.

Weekly homework assignments will count as 40% of the final grade and will consist of problems and exercises from the texts and from the instructor. These assignments will involve extensive use of sample datasets that will be available through Blackboard. These exercises will be graded on a pass/fail basis.

The final exam in this course will be an in-class and open book exam that is designed to prepare students for the statistics qualifying exam. The exam will be conducted during the last class and there will be time during finals week for students to review and receive feedback on their exams.

Assignment	Percentage of Grade
Data Project One	20%
Data Project Two	20%
Lab & Homework Exercises	40%
Final Exam (in class, open book)	20%

VI. REQUIRED TEXTS/MATERIALS

Meyers, Lawrence S., Gamst, Glenn, & Guarino, A.J. (2006). *Applied Multivariate Research: Design and Interpretation (1st edition)*. Thousand Oaks, CA: Sage Publications, Inc.

Mertler, C.A. & Vannatta, R.A. (2005). *Advanced and multivariate statistical methods* (4th ed.) Glendale, CA: Pyrczak Publishing.

SPSS version 21.
SPSS is available to Wayne State University students for free through the Software Clearinghouse. I encourage students to install SPSS on your own computer. The necessary hardware and software are also available in the Thompson Home computer lab, as well as many other computer labs on campus (e.g. Purdy Kresge Library). Here is a list of computer labs, their hours, and the policies governing their use:
http://www.computing.wayne.edu/labs/

VII. ADDITIONAL RECCOMENDED RESOURCES

American Psychological Association (2010). *Publications manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

Cronk, B. (2010). How to use PASW: *A step-by-step guide to analysis and interpretation. (6th edition).* Glendale, CA: Pyrczak Publishing.

Kutner, M.H., Nachtsheim, C. J., & Neter, J. (2004). *Applied linear regression models. (4th edition).* Boston, MA*:* McGraw Hill Irwin.

Morgan, S., Reichet, T., & Harrison, T. (2002). *From numbers to words: Reporting statistical results for the Social Sciences.* Boston: Allyn and Bacon.

VIII. STUDENTS WITH DISABILITIES

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for the coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. The SDS telephone number is 313-577-1851 or 313-577-3365 (TDD Only). The SDS website is at http://studentdisability.wayne.edu/. If you feel that you may need an accommodation based on the impact of a disability or already have accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

IX. GROUND RULES FOR DISCUSSION

In social work courses we sometimes discuss controversial topics, it is important that we recognize that we will all have differing opinions, backgrounds and experiences. So that we may all gain the most from our time together, asking questions and sharing our own perspectives as they relate to the material will definitely come up, and is encouraged. Therefore our ground rules will be:

Respectful Listening – we may not always agree with one another, but we each deserve to be heard. **It's also a good idea to make room for quieter students if you know you are a talker.**

Compassion – never forget there is a human being behind an opinion, and that we are all at different levels of growth, awareness, and life experience.

Confidentiality – when we share personal stories in the context of larger concepts, they become part of the classroom and should stay within that context.

X. TENTATIVE COURSE SCHEDULE

Session	Topic	Readings
1: Jan 9	**Introductions, Review of Syllabus, Review of fundamental research concepts & SPSS**	Meyers, Gamst & Guarino, Chapters 1 & 2
2: Jan 16	**Review of fundamental research concepts & SPSS (cont.), Data Screening & Handling Missing Data**	Meyers, Gamst & Guarino, Chapters 3A & 3B
3: Jan 23	**Data Screening & Handling Missing Data (cont.)** **Review of Correlation**	Meyers, Gamst & Guarino, Chapter 4A & 4B Mertler & Vannatta, Chapter 3
4: Jan 30	**Univariate Comparisons of Means**	Meyers, Gamst & Guarino, Chapter 8A & 8B
5: Feb 6	**Multiple Regression**	Meyers, Gamst & Guarino, Chapter s 5A & 5B Mertler & Vannatta, Chapter 7
6: Feb 13		
7: Feb 20	**Logistic Regression**	Meyers, Gamst & Guarino, Chapter s 6A & 6B Mertler & Vannatta, Chapter 11
8: Feb 27		
9: Mar 6	**Multi-level Modeling**	Meyers, Gamst & Guarino, Chapters 9A* & 19B* (*2013 version see Blackboard)
March 17 (Monday): Data Assignment One Due (submitted online by midnight)		
10: Mar 20	**MANOVA**	Meyers, Gamst & Guarino, Chapter s 5A* & 5B* (*2013 version see Blackboard) Mertler & Vannatta, Chapter 6
11: Mar 27	**Principal Components Analysis**	Meyers, Gamst & Guarino, Chapters 9A & 9B
12: April 3	**Principal Components Analysis (cont.) & Factor Analysis**	Meyers, Gamst & Guarino, Chapters 12A & 12B
13: April 10	**Factor Analysis** **Data Assignment Two Due**	Meyers, Gamst & Guarino, Chapters 12A, 12B, 16A & 16B Mertler & Vannatta, Chapter 9
April 12 (Friday): Data Assignment Two Due (submitted online by midnight)		
14: April 17	**Additional Issues in Data Analysis: Power Analysis & Complex Samples** **Final Exam**	TBA

XI. SELECTED BIBLIOGRAPHY

The following sources are resources that you may find helpful as you prepare your assignments and as future references.

Brown, T. A. (2006), Confirmatory Factor Analysis for Applied Research. New York: Guilford Press.

Enders, C. (2010). Applied Missing Data Analysis. New York: Guilford Press.

Grinnell, R. M. & Unrau, Y. A. (Eds.) (2010). *Social work research and evaluation: Foundations of evidence-based practice*. (9th Edition) Boston: Oxford University Press.

Hair, Joseph F., Jr; Black, William C.; Babin, Barry J.; and Anderson, Rolph E. (2009). *Multivariate Data Analysis, (7th Edition)*. Upper Saddle River, New Jersey: Prentice Hall.

Heeringa, S.G., West, B.T., and Berglund, P.A. (2010). *Applied Survey Data Analysis*. Chapman Hall / CRC Press: Boca Raton, FL. *Note this text provides a more detailed examination of issues in complex survey data analysis.*

Menard, S. (2010). Logistic regression: From introductory to advanced concepts and applications. Newbury Park, CA: Sage Publications.

Jose, P. Doing Statistical Mediation and Moderation. New York: Guilford Press.

Kimmel, A. J. (1988). *Ethics and values in applied social research.* Newbury Park, CA: Sage.

Kutner, M.H., Nachtsheim, C. J., & Neter, J. (2004). *Applied linear regression models. (4th edition).* Boston, MA*:* McGraw Hill Irwin.

Kutner, M.H., Nachtsheim, C. J., & Neter, J., Li, W. (2005). *Applied linear statistical models. (5th edition).* Boston, MA*:* McGraw Hill Irwin.

Tabachnick, B. G. & Fidell, Linda S. (2013). Using Multivariate Statistics (6th Edition). Boston, MA: Pearson Publishing.

Additional Websites that may be useful:

David Kenney's Website: http://davidakenny.net/

David Garson's Website: http://www2.chass.ncsu.edu/garson/pa765/statnote.htm

UCLA Stats Pages: http://www.ats.ucla.edu/stat/spss/default.htm and http://www.ats.ucla.edu/stat/dae/