Sociology 6130: Quantitative Research

University of Guelph

College of Social and Applied Human Sciences

Department of Sociology and Anthropology

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**Learning Outcomes**

By the end of this course, students should be able to:

* Learn new practical and applied research-related skills and market them in both academic and non-academic settings.
* Analyze and evaluate quantitative research in sociology, the social sciences, and sciences generally.
* Apply appropriate quantitative research methodologies to address contemporary, historical, social, and global issues.
* Develop and practice intellectual curiosity, analytic, problem-solving decision-making, and listening skills.

**Data Analytic Learning Outcomes**

In this course we will study general and generalized linear models in detail, including both statistical theory and practical applications. Students will gain practical experience using statistics and statistical software to analyze survey data. By the end of this course, they are expected to know how to use a variety of regression techniques and understand when they work and why they may not work under various conditions.

Students will also learn the tools necessary to become a proficient researcher when working with survey data and gain practical experience writing a research report. The lectures will cover the following topics: bivariate and multiple regression, regression diagnostics, path analysis, regression with limited dependent variables, and regression in matrix. We will also devote some time working through the logic of ordinary least squares (OLS) and maximum likelihood estimation (MLE), the statistical techniques most commonly used to obtain regression estimates for linear and generalized linear models. Students will confront issues that commonly arise when working with social surveys, such as how to deal with missing data and large surveys involving complex sampling designs. This course will also keep students up to date with the latest developments in statistical programming for applied social science research.

**The Research Project**

From beginning to end, this class is designed to teach graduate students how to become proficient analysts of survey data. By the end of the course, they are expected to be able to write a journal article quality research report on a topic of their choice. The project involves investigating the relevant literature to identify a research problem that can be addressed with datasets made available in the Data Resource Library on campus. Using the statistical techniques learned in class, students will review the relevant literature, analyze their data, report their results, discuss their findings, and generate some conclusions. The final paper will be approximately 25 and 30 pages, double spaced (including tables and appendices). Students who have taken this course in the past have used the final research project as preliminary research for their Masters thesis or PhD dissertation. Many have presented their research from this class at national and international conferences, and others have also published their papers in peer-reviewed journals.

It is assumed that students enter this course with experience using regression analysis (e.g., SOAN 3120). This course does not require a strong background in mathematics as this is a class in **applied** statistics and primarily intended to provide students with research opportunities that would otherwise be beyond their reach.

Attendance is extremely important as I address material in a slightly different way than it is covered in the text(s).

The primary statistical software package that will be used in this course is Stata. However, I will also provide some examples using SAS, SPSS, and R.

**\*Updated readings as well as corresponding chapters and supplements will be provided in class. However, some additional suggested readings are provided below.**

**Primary Recommended Text:** Agresti,Alan (2021) *Statistical Methods for the Social Sciences (5th Edition)*. Pearson. (E-book vesion available)

**Supplemental Texts (on reserve)**

Achen, Christopher H. (1982) *Interpreting and using Regression*. Series: Quantitative Applications in the Social Sciences, No. 29. Thousand Oaks, CA: Sage Publications.

Allison, Paul D. (1999) *Multiple Regression*. Thousand Oaks, CA: Pine Forge Press. Coming Soon (this book has been ordered)

Berry, William D. (1993) *Understanding Regression Assumptions*. Series: Quantitative Applications in the Social Sciences, No. 92. Thousand Oaks, CA: Sage Publications.

Berry, William D. and Stanley Feldman. (1985) *Multiple Regression in Practice*. Series: Quantitative Applications in the Social Sciences, No. 50. Thousand Oaks, CA: Sage Publications.

Fox, John (1991). *Regression Diagnostics* Series: Quantitative Applications in the Social Sciences, No. 79. Thousand Oaks, CA: Sage Publications.

Jaccard James J. and Robert Turrisi (2003) *Interaction Effects in Multiple Regression*. Series: Quantitative Applications in the Social Sciences, No. 72. Thousand Oaks, CA: Sage Publications.

Lewis-Beck, Michael S. (1980). *Applied Regression: An Introduction*. Series: Quantitative Applications in the Social Sciences, No. 22. Thousand Oaks, CA: Sage Publications.

Kalton, Graham (1993) *Introduction to Survey Sampling*. Series: Quantitative Applications in the Social Sciences, No. 35. Thousand Oaks, CA: Sage Publications.

Luke, Douglas (2004) *Multilevel Modeling*. Series: Quantitative Applications in the Social Sciences, No. 132. Thousand Oaks, CA: Sage Publications.

Menard, Scott (1995). *Applied Logistic Regression Analysis: Second Edition*. Thousand Oaks, CA: Sage Publications. Series: Quantitative Applications in the Social Sciences.

Pampel, Fred (2000) *Logistic Regression: A primer*. Series: Quantitative Applications in the Social Sciences, No. 132. Thousand Oaks, CA: Sage Publications.

Schroeder, Larry D., David L. Sjoquist, and Paula E. Stephan. (1986). *Understanding Regression Analysis: An Introductory Guide*. Series: Quantitative Applications in the Social Sciences, No. 57. Thousand Oaks, CA: Sage Publications.

Namboodiri, Krishnan (2006) *Matrix Algebra: An Introduction* Series: Quantitative Applications in the Social Sciences, No. 38. Thousand Oaks, CA: Sage Publications.

\* A detailed week-by-week summary of readings will be provided in class

**Evaluation**

TBA