THE UNIVERSITY OF MANITOBA
Winnipeg Manitoba

Department of Sociology

SOCIOLOGY 077.740 L01: Advanced Quantitative Research Methods

Shiva S. Halli **Fall 2003**
Office: S100A, Medical Service Building, Bannatyne Campus **3 Credit hrs**
Class Location: R060, 771 McDermot Avenue
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COURSE DESCRIPTION

1. GENERAL INFORMATION

A. Course Overview:

Sociology 077.740 is a graduate half course in quantitative methods. Problems and issues encountered in sociological research will be the focus. Students are assumed to have a sound grounding in methods and statistics enabling them to investigate more subtle issues than are presented in undergraduate courses (see the enclosed sheet of this handout for prerequisite). In addition to methodological techniques, a great deal of import will be given to the ability to critically analyze research as reported in sociological journals. Moreover, the use of SPSS and other statistical packages will be necessary to complete assignments and a project. Students are assumed to be familiar with these statistical packages.

B. Class Format:

Each class will consist of

1. Lecture (1 - 1 1/2 hours),

2. Discussion of lecture material and readings (1 hour),

and

3. Discussion of assignments, computing, etc. (1/2 - 1 hour).

C. Meetings: Thursday, 1:00 p.m. - 4:00 p.m., Rm R060, 771 McDermot Ave

D. Office Hours: Thursday, 12:00 - 1:00 p.m. and 4:00 - 5:00 p.m., or by appointment

E. Course Requirements:

Students will complete three assignments, each worth 10% of the final grade. They will also submit a research project that will account for 70%. The project guidelines sheet is attached. The paper (project) is due on December 1st and no extension will be granted. Those students who do not turn in their paper will receive no credit for the paper part. The assignments are due at the beginning

of class on the due dates. A penalty of 5 points (out of 100) per day (including weekends and holidays) will be deducted from late problem sets. In addition, once the problem set solution has been discussed in class (usually on week after the due date), late problem sets will not be accepted.

The following scale will be used to determine final grades:

A+ =	90% and over	C+ =	65% - 69%
A =	80% - 89%	C =	60% - 64%
B+ =	75% - 79%	D =	50% - 60%
B =	70% - 74%	F =	Less Than 50%

F. Readings: Required Text is:

S.S. Halli and K.V. Rao (1992). Advanced Techniques of Population Analysis. Plenum Press, New York.

Additional references are indicated along with the topics below.

G. Academic Dishonesty:

Cheating is a serious offense with grave consequences. Students should acquaint themselves with the University's policy on academic ethics, i.e., cheating (see pp. 23-24 of the University of Manitoba Graduate Calendar, 2003-2004).

H. Voluntary withdrawal deadline is November 12, 2003.

I. **TENTATIVE CALENDAR**

WEEK **TOPICS AND READINGS**

1-2 Administration and description of course

Multiple Regression: Some Basic Concepts and Operations
Pedhazur, pp. 45-66, 97-133, 68-94, 773-783
Blalock, pp. 429-440, 450-468, 454-466

Issues in Multiple Regression
Confidence intervals and hypothesis tests
Explanation and prediction
The Specification problem
Curvilinearity
Multicollinearity
Standardized vs. Unstandardized coefficients

Robert A. Gordon, "Issues in Multiple Regression", American Journal of Sociology 73 (March, 1968): 592-615.

Hubert Blalock, "Correlated Independent Variables: The Problem of Multicollinearity", Social Forces 62 (December, 1963): 233-238.

3 Multiple Regression Decomposition

Coleman, J.C., Z. D. Blum, A. Sorensen, and P.H. Rossi, "White and Black Careers During the First Decade of Labour Force Experience", Social Science Research 1(September, 1972):243-270.

4 Introduction to Causal Analysis
Path Analysis
Issues in Path Analysis

Pedhazur, pp. 577-633

Kenneth C. Land, "Principles of Path Analysis", Sociological Methodology 1969, pp. 3-37

David R. Heise, "Problems in Path Analysis and Causal Inference", Sociological Methodology 1969, pp. 38-73

Duncan, "Partials, Partitions, and Path, "Sociological Methodology, 1970, pp. 38-47

John M. Finney, "Indirect Effects in Path Analysis", Sociological Methods and Research 2 (1974): 175-186

D. F. Alwin and R. M. Hauser, "The Decomposition of Effects in Path Analysis", American Sociological Review 40(1975): 37-47

5 Principal Components Analysis and Factor Analysis I: The Basic Model

Kim and Mueller, Introduction to Factor Analysis SPSSX Manual, pp. 715-730

R. J. Rummel, "Understanding Factor Analysis." Journal of Conflict Resolution XI: 444-480

6 Factor Analysis II: Interpretation of Dimensions

Kim and Mueller, Factor Analysis: Statistical Models and Practical Issues.

7-8 Multiple Discriminant Function Analysis

Cacoullos, T. (ed.) Discriminant Analysis and Applications. New York, Academic Press, 1973.

Altman, H., et. al, "New Discriminant Functions for Computer Diagnosis". Multivariate Behavioural Research, 1976(July), 11(3), 367.

Bibb, R. and Roncek, D. W. "Investigating Group Differences: An Explication of the Sociological Potential of Discriminant Analysis". Sociological Methods and Research, 1976, 4, 349-379.

WEEK **TOPICS AND READINGS**

Contanza, M. C. and Afifi, A. A. "Comparison of Stopping Rules in Forward Stepwise Discriminant Analysis". Journal of the American Statistical Association, 1979, 74, 777.

9-10 Log-Linear Analysis for Multidimensional Contingency Tables

Bishop, Y. M. M., Fienberg, S. E., and Holland, P. W. Discrete Multivariate Analysis. Cambridge, Mass., MIT Press, 1975.

Fienberg, S. E. The Analysis of Cross Classified Categorical Data. Cambridge, Mass., MIT Press, 1977.

Davis, J. A. "Hierarchical Models for Significance Tests in Multivariate Contingency Tables: An exegesis of Goodman's recent papers" In: Costner, H. L. (ed.), Sociological Methodology 1973-74. San Francisco, Jossey-Bass, 1974.

Davis, J. A. "The Log-linear Analysis of Survey Replications". In: Land, K. C. and Spilerman, S. (eds.), Social Indicator Models. New York, Russel Sage, 1975.

11-12 Non-parametric Methods

Daniel, W. w. Applied Non-parametric Statistics Houghton Mifflin, 1978.

Sidney, Siegel, Non-parametric Statistics for the Behavioural Sciences, New York: McGraw-Hill, 1956.

13 Review of Course

PREREQUISITE MATERIAL FOR SOC. 077.740

1. Levels of Measurement
2. Descriptive Statistics
3. Probability
   - Addition and Multiplication Rules
   - Conditional Probability
4. Probability Distributions
5. Sampling Distributions of
   - Mean
   - Proportion
   - Difference in means
   - Difference in proportions
   - Variance
   - Ratio of variances
6. Confidence intervals for each of the settings in 5 above
7. Elements of Hypothesis Testing
8. Statistical tests for each of the settings in 5 above
9. Chi square tests
10. Introduction to simple regression and correlation
11. Introduction to analysis of variance

RESEARCH PAPER GUIDELINES FOR SOC. 077.740

As part of the requirements for this course, student will design and execute a small research project using secondary analysis of existing data. In most cases, this will entail the use of survey data sets that are available. However, some students may wish to use published census data or data that is aggregated and made available through other published sources.

This assignment involves the generation of some testable hypotheses that can then be evaluated empirically. Students will be expected to demonstrate the skills and techniques that they have learned in the course.

The final product should take the following form:

1) A brief review of some body of literature in sociology in which some hypotheses are deduced logically.
2) A discussion of the constructs to be used in the analysis and justification for the selection of a particular data set. A description of the operational definitions used, the reliability and validity of the measures, and a discussion of the potential flaws in the measurement procedure should also be included.
3) A description and evaluation of the suitability of the sample that constitutes the data set should be provided.
4) A test of the hypotheses should be conducted using appropriate statistical techniques.
5) A discussion of the results should be presented with appropriate conclusions.

This project is one which students should begin to work on as soon as they can. Students should ensure that their selection of a topic is a manageable one and should, therefore, consult with their instructor early in the term.