



COURSE TITLE/SECTION: SOCW 8325 (30297) Applied Multivariate Statistics

TIME: Monday 1:00 p.m. – 4:00 p.m., Room 229 Social Work Building

FACULTY: Patrick Leung, PhD **OFFICE HOURS:** M 12-1 & 4:00-5:00 p.m.

E-mail: pleung@uh.edu Phone: 713-743-8111 FAX: 713-743-8149

I. Course

A. Catalog Description

Prerequisite: SOCW 8324 Bio Statistics and doctoral standing in social work. Emphasizes the use of the Statistics Package for Social Sciences (SPSS) in applied social work research.

B. PURPOSE

The purpose of this course is to prepare students to use SPSS to analyze data in a wide variety of applied research settings. This course will focus on advanced statistical procedures in association with procedures in SPSS. Multiple Regression, Analysis of Variance and Analysis of Covariance will be highlighted in the SPSS Program.

II. Objectives

Upon completion of this course, students will be able to:

1. Demonstrate an understanding of the relationship between research design and the use of SPSS in applied social work research;
2. Demonstrate the use of the Statistical Package for Social Sciences to analyze multivariate statistical data in applied social work research;
3. Demonstrate an understanding of the principles of probability theory in basic multivariate statistical analyses including Multiple Regression, Analysis of Variance, Analysis of Covariance in association with the SPSS Program ; and
4. Demonstrate an understanding of the programming and commands in the SPSS Program.

III. Course Content

This course is the second of three required statistics courses in the doctoral curriculum. A topical outline is included with the class schedule and reading assignments in a separate attachment to this syllabus.

IV. Course Structure

The course will be taught using a combination of instructional methods including group and class discussions, lectures, exercises, assigned and recommended readings, and homework assignments. Computer technology for statistical analyses will also be included.

V. Required Texts/Software

Abu-Bader, S. (2010). Advanced and multivariate statistical methods for social work research. Chicago, IL: Lyceum Books, Inc.

Field, A.(2009). Discovering statistics using SPSS (3rd ed.). Beverly Hills, CA: Sage Publications.

Norusis, M. (1997). SPSS 7.5 guide to data analysis. Upper Sadle River, New Jersey: Prentice Hall, chapters 19-23.

SPSS, Inc. (2011). SPSS 20.0 for windows brief guide. Chicago, IL: SPSS Inc (or the latest version).

SPSS, Inc. (2011). SPSS for windows graduate pack version, Version 20.0. Chicago, IL: (Author) (or the latest version).

Recommended Texts

American Psychological Association. (2009). Publication manual of the American Psychological Association (6th ed.). Washington, DC: Author.

Allison, Paul D. (1999). Multiple regression: A primer. Thousand Oaks, CA: Pine Forge Press.

Beck-Lewis, Michael S. (1980). Applied regression: An introduction. Beverly Hills, CA: Sage Publications.

Berry, William D. & Feldman, Stanley (1985). Multiple regression in practice. Beverly Hills, CA: Sage Publications.

Bray, James H. & Maxwell, Scott E. (1985). Multivariate analysis of variance.

Beverly Hills, CA: Sage Publications.

Green, S, & Salkind, N. (2011). Using SPSS for Windows and Macintosh: Analyzing and understanding data (6th ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.

Grimm, L., & Yarnold, P. (Eds.). (1995). Reading and understanding multivariate statistics. Washington, D.C.: American Psychological Association.

Iversen, Gudmund R. & Norpoth, Helmut (1976). Analysis of variance. Beverly Hills, CA: Sage Publications.

Kinnear, P.R., & Gray, C.D. (1999). SPSS for windows made simple. 3rd ed. East Sussex UK: Psychology Press, Publishers.

Tabachnick, B.G., & Fidell, L.S. (2007). Using multivariate statistics (5th ed.). Boston, MA: Allyn and Bacon.

Wildt, Albert R. & Ahtola, Olli T. (1978). Analysis of covariance. Beverly Hills, CA: Sage Publications.

VI. Course Requirements

A. Reading Assignments

Please see Topical Outline and Reading Assignments.

B. Written Assignments

To assist students in completing the learning objectives for this course, there will be three graded homework assignments related to the course content. Only hard copies of the assignments will be accepted.

C. Final Exam

A final exam will be required of all students to demonstrate their knowledge and competency in multivariate statistical analysis.

D. Class Participation

1. Class Attendance (5%)

One point will be taken from the final grade for each absence from class. However, a student who is absent from class for more than five times (including both excused and non-excused absence) will be dropped from the course. In the case that the absence is approved by the instructor, half a point will be deducted from the final grade.

2. Class Participation (5%)
Students are expected to participate in class discussions and projects.

VII. Evaluation and Grading

Final course grades will be based on the following distribution:

Feb. 25	Homework Assignment #1 Due	20%
March 25	Homework Assignment #2 Due	20%
April 15	Homework Assignment #3 Due	20%
April 29	Final Exam	30%
	Class Participation	5%
	Class Attendance	5%

The following standard grading scale has been adopted for all courses taught in the college:

A =	96-100% of the points	C+ =	76-79.9%
A- =	92-95.9%	C =	72-75.9%
B+=	88-91.9%	C- =	68-71.9%
B =	84-87.9%	D =	64-67.9%
B- =	80-83.9%	F =	Below 64%

No "incomplete" grades will be given by any instructor without prior permission (excluding an unforeseen emergency) from the instructor.

VIII. Policy on grades of I (Incomplete):

The grade of "I" (Incomplete) is a conditional and temporary grade given when students are either **(a)** passing a course or **(b)** still have a reasonable chance of passing in the judgment of the instructor but, for non-academic reasons beyond their control have not completed a relatively small part of all requirements. Students are responsible for informing the instructor immediately of the reasons for not submitting an assignment on time or not taking an examination. Students must contact the instructor of the course in which they receive an "I" grade to make arrangements to complete the course requirements. Students should be instructed not to re-register for the same course in a following semester in order to complete the incomplete requirements.

The grade of "I" must be changed by fulfillment of course requirements within one year of the date awarded or it will be changed automatically to an "F" (or to a "U" [Unsatisfactory] in S/U graded courses). The instructor may require a time period of less than one year to fulfill course requirements and the grade may be changed by the instructor at any time to reflect work complete in the course. The grade of "I" may not be changed to a grade of **W**.

IX. Policy on academic dishonesty and plagiarism

Students are expected to demonstrate and maintain a professional standard of writing in all courses, do one's own work, give credit for the ideas of others, and provide proper citation of source materials. Any student who plagiarizes any part of a paper or assignment or engages in any form of academic dishonesty will receive an "I" for the class with a recommendation that a grade of F be assigned, subsequent to a College hearing, in accordance with the University policy on academic dishonesty. Other actions may also be recommended and/or taken by the College to suspend or expel a student who engages in academic dishonesty.

All papers and written assignments must be fully and properly referenced using APA style format (or as approved by the instructor), with credit given to the authors whose ideas you have used. If you are using direct quotes from a specific author (or authors), you must set the quote in quotation marks or use an indented quotation form. For all direct quotes, you must include the page number(s) in your text or references. Any time that you use more than four or five consecutive words taken from another author, you must clearly indicate that this is a direct quotation. Please consult the current APA manual for further information.

Academic dishonesty includes using any other person's work and representing it as your own. This includes (but is not limited to) using graded papers from students who have previously taken this course as the basis for your work. It also includes, but is not limited to submitting the same paper to more than one class. If you have any specific questions about plagiarism or academic dishonesty, please raise these questions in class or make an appointment to see the instructor. This statement is consistent with the University Policy on Academic Dishonesty that can be found in your UH Student Handbook.

X. Consultation

Individual appointments will be scheduled with any member of the class upon request. The instructor can be reached by calling (713) 743-8111 or contacting him in his office during office hours (Work Building Room 412), or by e-mail at PLEUNG@UH.EDU or by fax at (713) 743-8149.

Addendum: Whenever possible, and in accordance with 504/ADA guidelines, the University of Houston will attempt to provide reasonable academic accommodations to students who request and require them. Please call 713-743-5400 for more assistance.

TOPICAL OUTLINE AND READING ASSIGNMENTS

<u>Class Session</u>	<u>Lecture Topic and Readings</u>
January 14	Introduction Review of Course Syllabus A Framework for Statistical Analysis Review of Univariate and Bivariate Statistics Abu-Bader Chs. 1 & 2 Field Chs. 1, 2, 3, 4, 6 and 9
January 21	MLK Holiday (no class)
January 28	Review of Simple Linear Regression Abu-Bader Ch. 3
February 4	Issues in Statistical Assumptions Field Ch. 5
February 11 to February 18	Multiple Regression Analysis I The Regression Assumptions Confidence Intervals and significance test The Prediction Error for Y Analysis of Residuals Abu-Bader Ch. 4 Field, Ch. 7
<u>February 25</u>	<u>Homework Assignment #1 Due</u>
February 25	Multiple Regression Analysis II The General Equation Interpreting the Parameter Estimates The Multiple R-square Predicting Y The Possibility of Interaction Effects Dummy Variables Norusis, Chs. 19-23 (to be placed outside my office door)
March 4	Multiple Regression Analysis III Specification Error

Measurement Error
Multicollinearity & Nonlinearity

March 11	Spring Break (No Class)
March 18	One-Way ANOVA Two-Way ANOVA Abu-Bader Chs. 1 and 6 Field, Chs. 10 (ANOVA), 12 (Factorial ANOVA) and 13 (Repeated Measure Designs if time permits)
<u>March 25</u>	<u>Homework Assignment #2 Due</u>
March 25 to April 1	Two-Way ANOVA Two-way Analysis of Covariance Abu-Bader Chs. 7 Field, Chs. 11 (ANCOVA) and 14 (Mixed Design ANOVA if time permits)
<u>April 15</u>	<u>Homework Assignment #3 Due</u>
April 8 to April 22	MANOVA & MANCOVA Abu-Bader Ch. 9 Field, Ch. 16
April 29	Final Exam

BIBLIOGRAPHY

Statistical Methods: Basic

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- Frankfort-Nachmias, C. & Leon-Guerrero, A. (2006). Social Statistics for a diverse society (4th ed.). Thousand Oaks: Pine Forge Press
- Guilford, J.P., & Fruchter, B. (1978). Fundamental statistics in psychology and education (6th ed.). New York: McGraw-Hill.
- Healey, J.F. (1984). Statistics: A tool for social research. Belmont, CA: Wadsworth.
- Hopkins, D.K., Hopkins, B.R., & Glass, G.V. (1996). Basic statistics for the behavioral sciences. Boston : Allyn and Bacon. *(HA29 .H734 1996)
- Kuehl, R.O. (2000). Design of experiments : statistical principles of research design and analysis. Pacific Grove, CA : Duxbury/Thomson Learning.
*(Q182.3 .K84 2000)
- Larsen, R.J., & Marx, M.L. (1981). An introduction to mathematical statistics and its applications. Englewood Cliffs, NJ: Prentice-Hall. *(QA276.L314)
- McPherson, G. (2001). Applying and interpreting statistics: a comprehensive guide. New York: Springer. *(Q180.55.S7 M36 2001)
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- Newman, I. & Newman, C. (2006). Conceptual Statistics for Beginners. Lanham, MD: University Press of America. *(QA276.12.N47 2006)
- Ohrnstedt, G.W.B., & Knoke, D. (1982). Statistics for social data analysis. Itasca, IL: Peacock.
- Zeller, R.A., & Carmines, E.G. (1978). Statistical analysis of social data. Chicago: Rand McNally.

Multivariate Analysis: General

- Atkinson, A. C., Riane, M., & Ceriole, A. (2004). Exploring multivariate data with the forward search. New York: Springer-Verlag . *(QA278.A85 2004)
*(QA278.75.A38 2005)
- Baxter, M.J. (1994). Exploratory multivariate analysis in archaeology. Edinburgh: Edinburgh University Press. *(CC80.6.B39 1994)
- Bernstein, I.H., Garbin, C.P., & Teng, G.K. (1988). Applied multivariate analysis. New York: Springer-Verlag. *(QA278.B457 1988)
- Berry, W.D., & Feldman, S. (1985). Multiple regression in practice. Beverly Hills, CA: Sage.
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- Busch, D.H. (1991). The new critical path method: CPM: The state-of-the-art in project modeling and time reserve management. Chicago: Probus Publishing Company.
*(TS158.B87 1991)
- Bryne, B.M. (1989). A primer of LISREL: Basic applications and programming for confirmatory factor analytic models. New York: Springer-Verlag.
*(HA32 .B97 1989)
- Carroll, J.D., & Green, P.E. (1997). Mathematical tools for applied multivariate analysis. San Diego: Academic Press. *(QA278 .C37 1997)
- Child, D. (1990). The essentials of factor analysis (2nd ed.). London: Cassell.
- Christensen, R. (1990). Log-linear models. New York: Springer-Verlag.
*(QA278.C49 1990)
- Cooley, W.W., & Lohnes, R.R. (1971). Multivariate data analysis. New York: Wiley. *(QA278.C65)
- Cox, T. (2005). An introduction to multivariate data analysis. London: Hodder Arnold.
*(QA 278.C698 2005)
- Crowder, M.J., & Hand, D.J. (1990). Analysis of repeated measures (1st ed.). London: Chapman and Hall.
- Dunn, O.J., & Clark, V.A. (1987). Applied statistics: Analysis of variance and regression (2nd ed.). New York: Wiley. *(QA279.D87 1987)

- Dwyer, J.H. (1983). *Statistical models for the social and behavioral sciences*. New York: Oxford University Press. *(H61.25 .D85 1983)
- Edwards, A.L. (1985). *Multiple regression and the analysis of variance and covariance* (2nd ed.). New York: W.H. Freeman. *(BF39.E32 1985)
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- Grimm, L.G., & Yarnold, P.R. (Ed.). (2000). *Reading and understanding more multivariate statistics*. Washington, DC: American Psychological Association. *(QA278.R32 2000)
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- Giri, N. C. (1996). *Multivariate statistical analysis*. New York : M. Dekker. *(QA278 .G557 1996)
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Factor Analysis

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analysis. Mahwah, N.J.: Lawrence Erlbaum. *(QA278.6 .L64 1998)

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Press. *(HA33 .R85)

Discriminant Function Analysis

Klecka, W.R. (1980). Discriminant analysis. Beverly Hills, California: Sage Publications. †
HA31.4 .K56)

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York: Wiley. *(QA278.65.M38 1992)

Meta-analysis

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MD (5600 Fishers Lane, Rockville 20857) : U.S. Dept. of Health and Human
Services, National Institutes of Health, National Institute on Drug Abuse, Division
of Epidemiology and Prevention Research : [Supt. of Docs., U.S. G.P.O.,
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