



**COURSE TITLE/SECTION:** SOCW 8325 (22291) Applied Multivariate Statistics

**TIME:** Tuesday 1:00 p.m.– 4:00 p.m., Room 231 Social Work Building

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

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## **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 (3<sup>rd</sup> 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. (2010). SPSS 19.0 for windows brief guide. Chicago, IL: SPSS Inc (or the latest version).

SPSS, Inc. (2010). SPSS for windows graduate pack version, Version 19.0. 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 (6<sup>th</sup> 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.

Kinney, 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 (5<sup>th</sup> 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. 21	Homework Assignment #1 Due	20%
March 20	Homework Assignment #2 Due	20%
April 10	Homework Assignment #3 Due	20%
April 24	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 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 413), 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 17	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 24	Review of Simple Linear Regression  Abu-Bader Ch. 3
January 31	Issues in Statistical Assumptions  Field Ch. 5
February 7 to February 14	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
<b><u>February 21</u></b>	<b><u>Homework Assignment #1 Due</u></b>
February 21	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)
February 28	Multiple Regression Analysis III Specification Error Measurement Error Multicollinearity & Nonlinearity

March 6	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)
March 13	Spring Break (No Class)
<b><u>March 20</u></b>	<b><u>Homework Assignment #2 Due</u></b>
March 20 to March 27	Two-Way ANOVA Two-way Analysis of Covariance Abu-Bader Chs. 7 Field, Chs. 11 (ANCOVA) and 14 (Mixed Design ANOVA if time permits)
<b><u>April 10</u></b>	<b><u>Homework Assignment #3 Due</u></b>
April 3 to April 17	MANOVA & MANCOVA Abu-Bader Ch. 9 Field, Ch. 16
April 24	Final Exam

## BIBLIOGRAPHY

### Statistical Methods: Basic

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\* ([HA29 .B59 1972](#))
- Elifson, K.W., Runyon, R.P., & Haber, A. (1982). *Fundamentals of social statistics*. Reading, MA: Addison-Wesley.
- Frankfort-Nachmias, C. & Leon-Guerrero, A. (2006). *Social Statistics for a diverse society* (4<sup>th</sup> ed.). Thousand Oaks: Pine Forge Press
- Gravetter, F. J. (2011). *Essentials of statistics for the behavioral sciences*. Belmont, CA: Wadsworth/Cengage Learning.\* ([HA29.G726 2011](#))
- Guilford, J.P., & Fruchter, B. (1978). *Fundamental statistics in psychology and education*(6<sup>th</sup> 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](#) )
- Howell, D.C. (2011). *Fundamental statistics for the behavioral sciences*. Belmont, CA: Wadsworth Cengage Learning.  
\* ([HA29.H78 2001](#))
- 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.



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MacEachron, A.E. (1982). *Basic statistics in the human services: An applied approach*. Baltimore: University Park Press.

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Ohrnstedt, G.W.B., & Knoke, D. (1982). *Statistics for social data analysis*.

Itasca, IL: Peacock.

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### **Multivariate Analysis: General**

Afifi, A. A. (2012). *Practical multivariate analysis*. Boca Raton, FL : Taylor & Francis.

Atkinson, A. C., Riane, M., & Ceriole, A. (2004). *Exploring multivariate data with the forward search*. New York:

Springer-Verlag . \*([QA278.A85 2004](#))

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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.

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Bray, J.H., & Maxwell, S.E. (1985). *Multivariate analysis of variance*. 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.

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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.

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\*( [QA 278. C698 2005](#) )

Crowder, M.J., & Hand, D.J. (1990). *Analysis of repeated measures* (1<sup>st</sup> ed.). London: Chapman and Hall.

Dunn, O.J., & Clark, V.A. (1987). *Applied statistics: Analysis of variance and regression* (2<sup>nd</sup> ed.). New York: Wiley.

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### **Multiple Correlation/Regression**

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