

COM 531: Multivariate Statistical Methods

Spring 2009

6-8 pm, Tuesday/Thursday

MU 208 & 222

Prof. Kim Neuendorf

MU 241

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Office hrs.:

Tues. & Thur. 3:00-4:30 .

& by appt.

COURSE OBJECTIVE: Building on the foundation of COM 512, this course will cover more advanced quantitative analysis, with an emphasis on multivariate statistics. Inasmuch as the goal of the course is to develop your skills as designers, commissioners, and interpreters of research, an emphasis will be placed on the use and interpretation of complex statistics, rather than on the mechanisms of their calculation by hand. In the class, we will make frequent use of the data analytic computer package SPSS for Windows. (NOTE: SPSS 13.0 and higher creates output that is not compatible with 12.0 and lower.)

COURSE MATERIALS:

The following text is required:

Hair, J. F. Jr., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.

Other required readings:

*Many handouts prepared by your instructor will be distributed in class or posted on the class website throughout the term.

*It's recommended that students have available a manual or textbook on the use of SPSS. The following are recommendations:

George, D. (2007). *SPSS for Windows step by step: A simple guide and reference, 15.0 update* (5th ed.). Boston: Pearson Education.

SPSS manuals—check out the SPSS website.

The following texts are recommended for backup, and for additional information on selected topics. Some will be on reserve at the CSU Library:

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis*. Beverly Hills, CA: Sage.

Babbie, E. (2007). *The practice of social research* (11th ed.). Belmont, CA: Thomson Wadsworth.

- Blalock, H. M. (1979). *Social statistics* (2nd ed.). New York: McGraw-Hill.
- Bray, J. H., & Maxwell, S. E. (1985). *Multivariate analysis of variance*. Beverly Hills, CA: Sage.
- Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Newbury Park, CA: Sage.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Harris, R. J. (2001). *A primer of multivariate statistics* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Hayduk, L. A. (1987). *Structural equation modeling with LISREL: Essentials and advances*. Baltimore: The Johns Hopkins University Press.
- Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York: John Wiley & Sons, Inc.
- Kachigan, S. K. (1986). *Statistical analysis: An interdisciplinary introduction to univariate and multivariate methods*. New York: Radius Press.
- Keppel, G., & Wickens, T. D. (1991). *Design and analysis: A researcher's handbook* (4th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Klecka, W. R. (1991). *Discriminant analysis*. Newbury Park, CA: Sage.
- Kruskal, J. B., Wish, M. (1991). *Multidimensional scaling*. Newbury Park, CA: Sage.
- Maruyama, G. M. (1998). *Basics of structural equation modeling*. Thousand Oaks, CA: Sage.
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction* (3rd ed.). Fort Worth, TX: Harcourt Brace College Publishers.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson/Allyn & Bacon.
- Thompson, B. (1984). *Canonical correlation analysis: Uses and interpretation*. Beverly Hills, CA: Sage.
- Voelker, D. H., Orton, P. Z., & Adams, S. V. (2001). *Statistics*. New York: Wiley.

Williams, F., & Monge, P. (2001). *Reasoning with statistics: How to read quantitative research* (5th ed.). Fort Worth, TX: Harcourt Brace Publishers.

COURSE REQUIREMENTS:

Further information on each of these assignments will be discussed in class as the term progresses:

1. A midterm and a final exam. The midterm will have both take-home and in-class components, and the final exam will be take-home. The midterm take-home and the final exam both will include the requirement of some SPSS analyses. The final will include the critique of at least one published research article. The full midterm is worth 20% and the final exam 15% of your course grade. The in-class midterm will be held on Thur., March 12, and the take-home component will be due on the same day. The final exam will be due at 6 pm on Thur., May 14.
2. Data handling assignments--each student will be required to perform a number of data-handling tasks. Each student will be asked to conduct a variety of analyses on the data, including scale construction (worth 5%) and the running of multivariate statistics that are not included in the exams, presentation, or final project (worth 15%). All data handling assignments together are worth a total of 30% of your course grade.
3. In-class presentation on one multivariate statistic--each student will be assigned a technique to learn in detail, with one or two other students. The small-group presentation will include sample SPSS commands and output exemplifying the statistic as derived from a class data set. It will also include the findings correctly tabled, with a short written description of the findings. Each presentation is worth 20% of your grade. All presentations will be reviewed with the instructor prior to presentation.
4. A research report--this paper will include the development and testing of hypotheses using multivariate statistics, using a class data set and the SPSS program. Specific details on this assignment will be distributed in class. Students should plan on handing in both output and a complete, written analysis, worth 15% of your grade.

To summarize:

MIDTERM (2 parts)	40 pts.	20%
FINAL	30 pts.	15%
DATA HANDLING (various tasks)	60 pts.	30%
PRESENTATION	30 pts.	15%
REPORT	<u>40 pts.</u>	<u>20%</u>
	200 pts.	100%

COURSE OUTLINE:

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| 1. | A review of univariate and bivariate statistics | Hair et al., Chs. 1, 2 |
| 2. | SPSS & data handling and Scale construction | |
| 3. | Factor analysis | Hair et al., Ch. 3 |
| 4. | Multiple regression | Hair et al. Chs. 4, 4A |
| 5. | Discriminant analysis | Hair et al. Ch. 5 (D.A. sections) |
| 6. | Logistic regression | Hair et al. Ch. 5 (L.R. sections) |
| 7. | Multivariate analysis of variance (MANOVA) and covariance (MANCOVA) | Hair et al. Ch. 6 |
| 8. | Conjoint analysis | Hair et al. Ch. 7 |
| 9. | Canonical correlation | TBA |
| 10. | Cluster analysis | Hair et al. Ch. 8 |
| 11. | Multidimensional scaling and Correspondence analysis | Hair et al. Ch. 9 |
| 12. | Structural equation modeling | Hair et al. Chs. 11, 12 |
| 13. | Emerging techniques in multivariate analyses | TBA |