

**“Making Educational and Social Systems Work for All”
-- UO College of Education Mission Statement**

SPSY 620 Multivariate Statistics and Research Design
4 Credits – CRN 25342
University of Oregon – College of Education

2008 Winter Term Syllabus

Meeting Days/Time: **Monday 4:00-7:50 pm** (1600-1950)
Location: 101 Peterson Hall

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| Instructor: Joseph Stevens, Ph.D. | |
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| Office Hours: | Tuesday 1:00-3:00, Knight Library 248 or by appointment |

COURSE DESCRIPTION AND OBJECTIVES

The goal of the course is to learn how to apply and use several multivariate statistical techniques common in educational and psychological research. A secondary goal is to refine the student’s understanding of research design. Techniques covered in this course are Multivariate Analysis of Variance (MANOVA), Analysis of Covariance (ANCOVA and MANCOVA), Discriminant Function Analysis (DFA), Principal Components Analysis (PCA), and Exploratory Factor Analysis (EFA). For each technique, the topics covered include foundational concepts, computation, statistical assumptions, and the proper application, interpretation, and reporting of analysis results.

COURSE PREREQUISITES

EDLD 610, Multiple Regression is the required prerequisite course. Other intermediate courses in statistics may be acceptable as a prerequisite with permission of the instructor. This course will use the SPSS for Windows statistical software package. Relevant computer skills including experience with SPSS are prerequisite to the course.

REQUIRED MATERIALS

Stevens, J. P. (2001). *Applied Multivariate Statistics for the Social Sciences* (4th Ed.). Mahwah, NJ: Erlbaum.

We will cover chapters 1, 2, 4-9, 11, 13 in Stevens (omit pp. 413-452 in Chapter 11). Additional readings will be assigned during the semester. A good strategy for mastering the course material is to read the first two chapters right away and then a minimum of one chapter each week. You can then

review and reread chapters as topics are discussed in class (you must read statistics more than once if you want to understand it).

OTHER REFERENCES AND RESOURCES:

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th Ed.). Washington, DC: Author.

Dillon, W.R., & Goldstein, M. (1984). *Multivariate analysis: Methods and applications*. New York: John Wiley & Sons.

Gorsuch, R.L. (1983). *Factor Analysis*. Hillsdale, NJ: Erlbaum.

Grimm, L. G., & Yarnold, P. R. (1995). *Reading and Understanding Multivariate Statistics*. APA books.

Grimm, L. G., & Yarnold, P. R. (2000). *Reading and Understanding MORE Multivariate Statistics*. APA books.

Harris, R.J. (2001). *Primer of multivariate statistics*. Mahwah, NJ: Erlbaum.

Hays, W. L. (1981). *Statistics*. New York: Holt, Rinehart, and Winston.

Norušis, M.J. (2006). *SPSS® 14.0 guide to data analysis*. Upper Saddle River, NJ: Prentice-Hall, Inc. (or other recent editions)

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin Company.

Tabachnick, B.G., & Fidell, L.S. (1996). *Using multivariate statistics* (3rd ed.). New York: Harper Collins College Publishers.

Tatsuoka, M.M. (1971). *Multivariate analysis: Techniques for educational and psychological research*. New York: John Wiley and Sons.

Wilkinson, L. & Task Force on Statistical Inference. (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist*, 54, 594 – 604.

COURSE STRUCTURE AND REQUIREMENTS

SPSY 620 Multivariate Statistics is organized in a seminar format. The major activities consist of a combination of lectures, question and answer, and group discussions. Lab work, homework, and two writing activities are required as well as regular participation and discussion in the class.

- A. Lab work. There will be several in-class lab assignments during the quarter. Students are expected to work individually or in groups to practice assignments and techniques in running and interpreting analyses using SPSS (this will usually be during the last part of the class session). This work will be guided by assigned exercise and discussion questions. Lab work is graded pass/fail only.

- B. Homework. The purpose of the homework is to provide "hands-on" experience with multivariate statistics and to provide an evaluation of your ability to apply and interpret statistical techniques. There will be 4 homework assignments throughout the quarter. Homework must be completed on time to receive full credit; a minimum of ten percent of possible points will be deducted for late homework. All homework should be easily legible, one-sided, and stapled or fastened with a spring clip (no paper clips). Always include relevant SPSS output in support of the work done. All assignments require the use of SPSS for Windows.

- C. Writing Samples. There will be two writing assignments during the quarter. The purpose of the assignments is to provide practice and experience in interpreting and reporting multivariate results in the same style and format that would be used for professional publication. The assignments will consist of a Results and an abbreviated Discussion section prepared in APA style.

GRADING POLICY

The lab work will contribute 20%, the homework will contribute 60%, and the writing samples will contribute 20% of the course grade. Grading will be assigned on the percentage of possible points earned, 90% and higher for an “A”, 80-89% for a “B”, etc. Plus and minus grades will also be awarded. Work at the “C-“ level (73%) or below is graded as an “F”.

Late work will be penalized a minimum of 10%. Work is due at the beginning of class on the due date. Each student is responsible for submitting his/her own original work. Any instance of academic dishonesty (e.g., plagiarism, collaboration) will result in a minimum of a score of zero for the assignment. Collaboration is allowed on the lab work. Homework and writing assignments are not group projects. They should be completely your own independent work and no collaboration is allowed.

COURSE INCOMPLETES will be offered only very rarely and in unusual circumstances that truly prevent the student from completing course work during the regular course schedule. My policy on incompletes is more restrictive than the general UO policy. Incompletes will NOT be awarded simply because the student has not been able to finish course work. Incompletes will only be awarded when there is a documented medical or similar unforeseen emergency that prevents the student from completing course work.

SCHEDULE OF TOPICS AND ASSIGNMENTS (schedule may change depending on our pace)

| WEEK | TOPIC | ASSIGNMENT |
|---------------|---|---|
| 1 January 7 | Introduction and overview; Statistical Inference | Chapters 1 & 2 |
| 2 January 14 | Two group MANOVA, Matrix algebra | Chapter 4 Matrix algebra handout |
| 3 January 21 | K-group MANOVA <i>MLK day</i> | <i>Homework 1 Due January 22</i> Chapter 5 |
| 4 January 28 | Discriminant Function Analysis | Chapter 7, 8 <i>Writing Sample 1 Due</i> |
| 5 February 4 | Statistical Model Assumptions | <i>Homework 2 Due</i> Chapter 6 |
| 6 February 11 | Repeated Measures | Chapter 13 |
| 7 February 18 | ANCOVA and MANCOVA | Chapter 9 <i>Homework 3 Due</i> |
| 8 February 25 | | <i>Writing Sample 2 Due</i> |
| 9 March 3 | PCA and EFA | Chapters 11, 12 |
| 10 March 10 | | <i>Homework 4 Due</i> |
| 11 March 17 | Return homework | |

OTHER COURSE POLICIES

ATTENDANCE POLICY

Attendance is required to succeed in this course and master the course material. If a student does miss class, it is the student's responsibility to get class notes, and handouts or other distributed materials. Contact the instructor in case of illness or emergencies that preclude taking quizzes as scheduled or attending class sessions. Messages can be left on the instructor's voice mail or e-mail at any time of the day or night, prior to class. If no prior arrangements have been made before class time, the absence will be unexcused.

ACADEMIC MISCONDUCT POLICY

All students are subject to the regulations stipulated in the UO Student Conduct Code (<http://www.uoregon.edu/~conduct/>). This code represents a compilation of important regulations, policies, and procedures pertaining to student life. It is intended to inform students of their rights and responsibilities during their association with this institution, and to provide general guidance for enforcing those regulations and policies essential to the educational and research missions of the University.

CONFLICT RESOLUTION

The mission of the College of Education is to "Make educational and social systems work for all." Several options, both informal and formal are available to resolve conflicts for students who believe they have been subjected to or have witnessed bias, unfairness or other improper treatment. Within the College of Education, you can contact: Edward Kame'enui, Associate Dean for Curriculum and Academic Programs: 346-1644, ekamee@uoregon.edu, or Surendra Subramani, Interim Diversity coordinator 346-1473, Surendra@uoregon.edu.

Outside the College, you can contact:

UO Bias Response Team: 346-1139 or <http://darkwing.uoregon.edu/~brt/>

UO Conflict Resolution Services 346-0617 or <http://darkwing.uoregon.edu/~crs/>

UO Affirmative Action and Equal Opportunity 346-3123 or <http://aaeo.uoregon.edu/>

DIVERSITY

It is the policy of the University of Oregon to support and value diversity. To do so requires that we:

- respect the dignity and essential worth of all individuals.
- promote a culture of respect throughout the University community.
- respect the privacy, property, and freedom of others.
- reject bigotry, discrimination, violence, or intimidation of any kind.
- practice personal and academic integrity and expect it from others.
- promote the diversity of opinions, ideas and backgrounds which is the lifeblood of the university.

DOCUMENTED DISABILITY

Appropriate accommodations will be provided for students with documented disabilities. If you have a documented disability and require accommodation, arrange to meet with the course instructor within the first two weeks of the term. The documentation of your disability must come in writing from the Disability Services in the Office of Academic Advising and Student Services. Disabilities may include (but are not limited to) neurological impairment, orthopedic impairment, traumatic brain injury, visual impairment, chronic medical conditions, emotional/psychological disabilities, hearing impairment, and learning disabilities. For more information on Disability Services, please see <http://ds.uoregon.edu/>

EXPECTED CLASSROOM BEHAVIOR

Classroom expectations include:

- Participating in class activities
- Respecting the diversity of cultures, opinions, viewpoints in the classroom
- Listening to fellow students, professors, and lecturers with respect
- Arriving on time, prepared for class
- Attending for the duration of class; not reading other materials, books, newspapers
- Turn off cell phones and other electronic devices
- Racist, homophobic, sexist, and other disrespectful comments will not be tolerated.

GRIEVANCE

A student or group of students of the College of Education may appeal decisions or actions pertaining to admissions, programs, evaluation of performance and program retention and completion. Students who decide to file a grievance should follow the student grievance procedure, or alternative ways to file a grievance outlined in the Student Grievance Policy (<http://education.uoregon.edu/feature.htm?id=399>) or enter search: student grievance.

INCLEMENT WEATHER

In the event the university operates on a curtailed schedule or closes, UO media relations will notify the Eugene-Springfield area radio and television stations as quickly as possible. In addition, a notice regarding the university's schedule will be posted on the UO main home page (in the "News" section) at <http://www.uoregon.edu>.

If an individual class must be canceled due to inclement weather, illness, or other reason, a notice will be posted via email. During periods of inclement weather, please check your email rather than contact department personnel. Due to unsafe travel conditions, departmental staff may be limited and unable to handle the volume of calls from you and others.