

Brief Syllabus for Psy 670 – Draft Version of Dec. 11, 2012 – There will be changes.

MULTIVARIATE ANALYSES

(PSY 670 – C#22194 & crw22990)

Spring 2013

- a web-based course about multivariate statistics and related research methods used in Psychology and Education.

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IN any and all e-mail for this course PLEASE put the course number, Psy 670, in the subject line for your messages!

Course Introduction:

“This course, a Graduate School approved level IV research tools course, provides a conceptual introduction, as well as computational and computer competence, in modern multivariate procedures. Topics include multiple regression, discriminant function analysis, analysis of covariance, multiple analysis of variance, item analysis, cluster analysis, factor analysis, and canonical correlation. Applications to measurement and test construction are emphasized. Prerequisite: Level I - III research tools courses or equivalent or permission of instructor.”

– Quoted from a previous syllabus (and possibly the Graduate Catalog).

Personal interpretation – The focus will be on statistical analyses of data sets that have multiple Independent variables AND multiple Dependent variables – e.g., Multiple Regression and MANOVA will be emphasized. Also, procedures that reduce complexity (e.g., Factor Analysis and PCA) will be discussed. I will try to fit some MDSCAL into the course since I personally love the topic. Structural Equation Modeling and MLM will also be introduced since these topics are relatively new and are at the “leading edge” of the field. [Both are outgrowths of Multiple Regression and Factor Analyses.] Sorry, I will not get much into issues of psychometric theory, i.e., item analysis and test construction.

The emphasis will be upon identifying and choosing appropriate statistical procedures for data analyses. After a procedure has been selected, we will focus upon getting the analysis accomplished (usually via a computer) so that substantive conclusions about the meaning of the data can be made. Thus mathematical neatness and elegance may be minimized. A goal is for this course to help the working researcher.

Course Activities:

There is a required and recommended textbook. You will read about ½ of the required text.

There will be a set of seven (or eight) "Homework Assignments" which will be due at periodic intervals throughout the course. Collaboration with your colleagues is okay on these homework assignments – but make sure that your submissions at least look like they were

done independently.

There will be one (maybe two) mid-term Quizzes and a Final Exam. Exams must be worked on independently and without collaboration with others. I will post the Assignments and the Quizzes to the Doc Sharing Folder in *e-College* when I get them written (or when I want you to start working on them).

There will also be occasional "Discussion Group" tasks, in which I will pose a question (or two) and you will think about, research about, and then post a response. You will then engage in follow-up conversation and discussion with your classmates about the topic.

In several of the "Weeks" for this course there will be posted "Lectures." These represent my own maudlin rambles about specific topics that may or may not be covered in the published text materials. Be sure to read these missives when they appear.

Time Commitments:

A lot of work required for this course. It will be time consuming. This is a 3 credit graduate course so you should plan on **devoting between 9 and 12 (or more) clock hours** each week to this activity. The learning activities will be individual (rather than group) assignments. However, you will engage in substantive and timely discussions with classmates on all assignments via the course conferencing system. In order to successfully complete the course activities you should generally expect to connect at least three times per week. You can participate any time of the day or night since your discussions are asynchronous they will not take place in real time.

You may find that the level of activities are higher shortly after the beginning of the course and taper off toward the end of the course.

The learning of Statistics is more like the learning of a foreign language or a motor skill than it is like other academic endeavors. Learning only occurs with lots and lots of practice and repetition. In some other fields, e.g., Literature, reading a *play* and then one chapter in a *text*, and then hearing one *lecture* from a professor may be sufficient for you to be able to pontificate on the sexual imagery in *Hamlet*. But, believe me, three repetitions will not give you real skill and understanding of the statistical concept of *variance*. So what you will gain in this course is added depth in your knowledge (especially the whys of statistical processes) and lots of practice.

For those who have a background in operant reinforcement theory, this course (and ALL college courses) is really set up to run on a DRH schedule. Unfortunately, most students misrepresent the situation as a FI schedule. FI schedules produce post-reinforcement pauses and "scalping" cumulative records. Scalping and PRPs in your course-related behavior can get you into trouble.

Text materials:

Required:

Tabachnick, L., & Fidell, B. (2012). "Using Multivariate Statistics" 6th Ed." Allyn & Bacon.
ISBN-10: 0-205-849571 Or ISBN-13: 978-0205849574

Suggested: (Supplemental with verbal clarification of various issues, however, I forgot to tell the bookstore to order it, so we can get along without it.)

Mertler, C. A. & Vannatta, R. A. (2010?). "Advanced and Multivariate Statistical Methods, 4th Ed." Los Angeles, CA, Pyrczak Publications. ISBN ??

These are new editions. You can probably get along with use of the immediately previous edition of either book although some of the material will be dated.

Computers etc.

I assume that everyone who has a computer will have a word processor program and spreadsheet available. Unfortunately, MicroSoft’s WORD and EXCEL seem to be the universal coinage. I personally prefer to utilize Corel’s WordPerfect wordprocessor and QuatroPro spreadsheet. However, you can send me files in WORD (filename.doc) and EXCEL (filename.xls) format and I will be able to read them.

It is assumed that you will have access to the SPSS program which you can use to do all of the statistical calculations required for this course. There will be much discussion and instruction about the ins-and-outs of SPSS. Most of the homework assignments absolutely require its use. SPSS is available (free usage) in the psychology department’s computer lab in Henderson Hall (Rm 214) – if you are on campus and the lab is open. **Personal copies of the IBM-SPSS Graduate Pack should (are supposed to) be available through the bookstore(s).** The program used to be ‘sold’, but it now appears that it is available via 6-month or 1-year rental agreements. If the bookstore is not cooperative, see the SPSS website for a list of 3 or 4 on-line sources (with discounts). SPSS is expensive, but you should have used it in two other courses (at least) and again when you do your *Thesis* and/or *Dissertation*. [Maybe you can claim it as a tax deduction?] We will be spending time discussing SPSS and presenting materials that relate to how to use it.

Course Schedule:

Week	Read	Topic
	Tentative	
#1	1-14	T&F 1, 2, 3, 4 Review basic Statistics, Overview of MV Stats,
#2	1-21(22)	T&F 5 Metric Variables Multiple Regression Intro. HW-1 due 1-22
#3	1-28	T&F 5 Multiple Regression – essentials
#4	2-04	T&F 5 MR – Non-linear, moderators HW-2 due – 2-03
#5	2-11	T&F 6 Mixed IVs: ANCOVA HW-3 due 2-17
#6	2-18	T&F 7 Nominal IVs– Metric DVs: MANOVA Quiz 1 due 2-23
#7	2-25	T&F 8 Nominal IVs– Metric DVs: MANOVA –Profiles
#8	3-04	T&F 9, 10 Nominal DVs – Mixed IVs Discriminant Functions & Logistic Regression HW-4 due 3-03
#8-b	3-11	Spring Break

#9	3-18	T&F 9, 10	Nominal DVs – Mixed IVs	Discriminant Functions & Logistic Regression.
#10	3-25	T&F 13	Simplification & finding structure – Metric variables.	PC and FA HW – 5 due 3-25
#11	4-01	T&F 13	FA & PCA	
#12	4-08	T&F 14	FA extended:	HW – 6 due 4-07
#13	4-15	T&F 14	FA extended:	Structural Equation Models
#14	4-22	T&F 15	Quiz 2 due 4-22	SEM and MLM
#15	4-29	other sources	Simplification again– Ordinal data: MDSCAL & Cluster Analyses	HW-7 due 4-29
#16	5-06	Finals	Quiz 3 Due May 9 th	

Coda:

Human learning involves changing the personal meaning one attaches to various concepts. On a basic level, at the end of this course, you should have different (or changed) personal meanings for essential concepts such as *variance, covariance, variable, factor, interaction*, and perhaps 30 additional vocabulary items. At a higher cognitive level, you should be able to provide coherent and rational replies when someone comes to you and says "I have this humongous pile of numbers and numerical data..... What do I do with them?"

I look forward working with you this semester! Along with meeting the requirements for a **Level IV** research tool course, I think you will find this course very interesting. I hope that it changes the way you think about psychology and moves you toward independent inquiry.

[Okay, only strange people find stat courses interesting....but do try to enjoy the experience and change the personal meanings that you attach to the topic(s).]