Psychology 6323
Spring 2016

Psychometrics

Instructor: Osvaldo F. Morera, PhD
Office: Room 212, Psychology Building
Phone 747-5417
Office hrs: I will host office the day the homework assignment is due from 10 – 12. Otherwise, office hours will be on Tuesdays from 10-12.
Email: omorera@utep.edu
Lectures: 1:30 pm – 2:50 pm, 208 UGLC
Textbooks: R.P. McDonald, *Test theory: a unified treatment*. Lawrence Erlbaum Associates, 1999.

There will also be readings, which will be distributed during class.

Reading 1: Selected chapters from Allen, M.J. & Yen, W.M. (1979). Introduction to Measurement Theory.

Reading 2: Sijtsma, K. (2009). On the use, misuse and very limited usefulness of coefficient alpha. Psychometrika, 74, 107-120.

Reading 2 Supplements:

Cortina, J.M. (1993). What is coefficient alpha? An examination of theory and applications.

Morera, O.F. & Stokes, S.M. (in press). Coefficient α as a measure of test score reliability: Review of Three Popular Misconceptions. *American Journal of Public Health*.

Reading 3:

Selected chapters from Hambleton, R.K., Swaminathan, H. & Rogers, H. J. (1993). *Fundamentals of Item Response Theory*

Other Supplemental Readings

MacCallum, R.C., Widamin, K.F., Zhang, S. & Hong, S. (1999). Sample Size in Factor Analysis. *Psychological Methods, 4*, 84-99.

MacCallum, R.C., Browne, M.W., & Sugawara, H.M. (1996). Power Analysis and determination of sample size for covariance structure modleing. *Psychological Methods, 1*, 130-149.

Course Objective/Learning Objective:

This course covers what is commonly referred to as classical test theory (theory of psychological measurement and theory of mental tests) and factor analysis. We will also cover factor analysis, multiple regression and modern test theory (item response theory).

The course is intended to provide you with the conceptual and technical skills needed to develop and evaluate psychological tests and measures. Moreover, this course will provide with the foundations for further study of measurement theory (i.e., an advanced course on Item Response Theory).

Course Prerequisites:

It is assumed that you have knowledge of statistics through correlation and regression.

Evaluation:

Course grades will be based on points earned from the following sources:

Homework assignments	25%
Midterm exam	25%
Final exam	25%
Course project	25%

Homework Assignments:

Homework problem sets will usually be distributed during class and due 1 to 2 weeks later (depending on the length of the assignment). There should be between 8 – 10 homework assignments throughout the semester. Late homework assignments **will not be accepted**. If computer output is required for the homework, include only the part which is necessary for the solution and edit out any irrelevant output. Computer packages that will be used are SPSS, as well as some other software that accompanies the course text.

Exams:

There will be one mid-term exam and a final exam. The midterm examination will cover material in the assigned readings, lectures and handouts up through Chapter 8 of the course text. The final examination will be comprehensive. The examinations will be closed-book and closed-notes, but will you be able to bring in a number of crib sheets to

the exams. While the examinations are designed to be completed in the allotted time, I made arrangements to find another room such that you can have extra time to complete the final exam (if needed). On the days of the examinations, we will report to Room 310 of Psychology.

Evaluation

Although scores may be graded on a curve, I will grade no more conservatively than 85% or above equals an A. Scores between a 84% and a 70% will guarantee a B. Scores between a 69% and a 60% will guarantee a C. Scores between a 59% and a 50% will guarantee a D. Scores that are less than 50% will guarantee an F.

My "curving" consists of evaluating how you perform relative to everyone else in the class, while looking for gaps in the distribution to distinguish "A" students, "B" students and, if necessary, "C" students.

Course Project:

The course project is an important part of this course, and as such, is worth 25% of the grade. You will be required to work in a group (of no smaller than 2 people and no more than 4 people).   The project is described in further detail on another handout. Feel free to provide me with input concerning who you would like to with, but I will ultimately determine the make-up of each group.

The course project grade will consist of two components. The first part will consist of evaluations of an initial project proposal (5 points) and a final project proposal (10 points).   The last part will consist of a 75 point paper that your group will turn in at the end of the class. The project grade will be the sum of these three components and is worth 90 points.

Course Project Homework:

You **may** be required to make a class presentation (time permitting). This presentation would take place on **Thursday, April 28** and count as one of your homework assignments. All students **must** attend and participate in the class presentations.

Policy on Auditors

Student and faculty auditors are welcome in the class, as long as they complete the required university audit form. However, my first priority is to the students who are registered for the class. Students in the class get first dibs on seats in the class. In addition, if we were to ever wind up in the Vinson Computer Lab and seating in the computer lab becomes a problem, registered students get first dibs on the 4 machines

with LISREL. I also ask that auditors not submit any homework assignments or take any exams, as it is extra work on my part and the TA's part. If your attendance becomes sporadic, I expect that you will not slow down the class questions that were covered in prior lectures.

In short, your completion of the university audit form allows you the privilege of listening to the course material (and that is all). If your attendance requires additional time of my TA, additional time of myself or takes away from the learning experience from the registered students in the class, you should not audit this class.

Statistical Software

The course will use SPSS for many of the analyses. You should have access to SPSS in your labs and in Vinson Lab of the Psychology Building. I will also be using several macros that can be found on Dr. Andrew Hayes' website (www.afhayes.com or www.processmacro.org). You should make every attempt to ask your advisor to install the PROCESS macro on the computers in your lab. In addition, you should bookmark the following website (www.quantpsy.org), as we will be using several tools on this website.

The course text has affiliated software, but I will be relying more and more on the LISREL and the M*Plus* software packages. Class time will be devoted to learning the LISREL syntax language. LISREL 8.8 is also available on a number of machines in the Vinson Lab throughout the semester. The computers that have the full version of LISREL 8.80 installed are: dbvlab18 (utep tag #132801), dbvlab20 (utep tag #132803), dbvlab21 (utep tag #132796), and dbvlab23 (utep tag #132798),

Scientific Software (the distributors of LISREL) upgraded its version to 9.1. You can also download a free version of the student version of LISREL at the following website: http://www.ssicentral.com/lisrel/downloads.html. The student version limits the number of variables that you can analyze at one time (I think it is 12 variables). Products from Scientific Software (which includes LISREL) can also be rented for 6-months and for 12-months). Their website is www.ssicentral.com.

I am "old school" when it comes to using LISREL and I type out LISREL syntax. I will teach you how to type out LISREL syntax. I am trying to upgrade my training, as PRELIS can be used to read in data to create .psf files (Version 8.8) and .lsf files (Version 9.1). These.psf and .lsf files have many wonderful features (for example, you can do multilevel modeling in PRELIS and you can impute missing data in PRELIS).

Other LISREL manuals that will be made available that allow for easier LISREL programming (the SIMPLIS language). There is a point-shoot-click version of LISREL (the interactive version of LISREL). Using SIMPLIS or the Interactive version is

acceptable, but I'll teach using LISREL syntax. More of the "state of the art" procedures require the use of LISREL syntax, so it is important to know what LISREL syntax means. A series of useful guides on LISREL from Kansas University will also be made available in the class handouts.

Finally, there is another software program called M*Plus*, which I am becoming more acquainted with. An M*Plus* manual is available in the main office that you can use. M*Plus* is also syntax-based, but it is an easier language to learn than LISREL and you will probably like it better than writing LISREL syntax. You'll have the option of using either LISREL or M*Plus* to complete your assignments, but you should be familiar with output from either package as it could appear on your exams. M*Plus* is installed on the four machines that have LISREL 8.8.

Course structure and requirements:

1.   Students will be responsible for all material covered in lectures, class handouts and assigned readings. With regard to lectures, there is no such thing a stupid question (in most cases). If you have a question, someone else probably has that same question. Feel free to ask any questions.

2.   Make-up exams will be given only under extraordinary circumstances, such as documented sickness, hospitalization or death of a family member (funeral card required). In some other cases, exceptions will be made if **advance notice of absence** is provided.

3.   Exams are closed books and closed notes. However, you will be allowed to use crib sheets (see accompanying handout). As you can bring in crib sheets to the exam, examinations truly designed to test your knowledge of the content area. While the exams are designed to be completed in the allotted time, you will have extra time to complete the final exam (if necessary).

4.   A calculator is highly recommended. It should perform all basic mathematical operations and should have several memories.

5.   There will between 8 and 10 homework assignments. Many of the homework assignments will require the use of statistical software. We will use SPSS in this class. SPSS can be run on the machines in Room 202 of the Psychology Building. SPSS is also available by logging on to **my.apps.utep.edu**.

6.   **Please turn off all pagers, beepers and other electronic devices before entering class.** They are a distraction to other students in the class and to the professor.

7. **Office Hours and Appointments**: If you have questions concerning the topics of this course, you can stop by to see me during my office hours or please do not hesitate to make an appointment to see me. If you stop by my office and you do not have an appointment to see me, I will ask you to schedule an appointment to see me and I will answer your question during that appointed time. This policy also applies to "questions that will only take a minute to answer."

8. **Conduct of Graduate Students**: Students enrolled in this course are graduate students and I have certain expectations of graduate students. As you are pursuing an advanced professional degree, I expect that you will act in a professional manner. Asking for extensions on assignments because you are busy with other courses/projects/papers is not professional.   In addition, I also expect that you will show respect to everyone in the class.

9. Academic Misconduct: The Department of Psychology follows the university policy on academic honesty that is published in the Undergraduate College-Academic Regulations and is available to all members of the University community. Additional information on academic misconduct can also be found at the following links:

   http://studentaffairs.utep.edu/Default.aspx?tabid=4386

   http://admin.utep.edu/Default.aspx?PageContentID=2084&tabid=30292

   This policy represents a core value of the University and all members of the university community are responsible for abiding by its tenets. Lack of knowledge of this policy is not an acceptable defense to any charge of academic dishonesty. The University has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their own work, for the appropriate citation of sources and for respect of others' academic endeavors.

   In other words, plagiarism, cheating and academic dishonesty will not be tolerated in this class. Plagiarism consists of using another person's ideas, words, or assistance, while failing to acknowledge this person. If you must submit someone else's work as if it were you own, you must acknowledge the original author/original source. If I suspect any incidence of academic dishonesty, plagiarism, collusion, cheating, etc. on any class assignment or exam, I will be more than happy to forward suspected material to the Office of Student Conduct and Conflict Resolution.

10. Accommodations for Students with Disabilities: If you have an identified disability

that may affect your performance in this class, please see the instructor (no later than the second class) or contact the Center for Accommodations and Support Services in Room 106 of the Student Union (phone 747-5148) such that provisions can be made to ensure that you have an equal opportunity to meet all the requirements of this course.

11.   I have also assigned supplemental readings. You are responsible for reading these papers, as I may ask questions concerning these readings on homeworks and/or examinations. Additional readings may be added during the semester.

Important Dates to Remember

Wednesday, February 3	Census Day; Last day to drop course without "W" appearing on transcript
Friday, February 12	Pass/Fail Grade Option Selection Deadline
Thursday, March 5	**Midterm**
March 7 – March 11	Spring break
Friday, April 1	Course drop deadline
Thursday, May 5	Last Day of our class
Thursday, May 12	**Cumulative Final Exam (1:00 pm – 3:45 pm)**
Wednesday, May 18	Grades due to Records Office

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Tentative Course Schedule

Date	Topic	Reading
1/19, 1/21	Course overview General introduction and the algebra of expectations	Chapter 1
1/21, 1/26	Items and item scores	Chapter 2
1/28, 2/2	Item and test statistics	Chapter 3
2/4	The concept of a scale	Chapter 4
2/9 - 2/11	Classical Test Theory	Chapter 5 & Reading 1

INITIAL PROJECT PROPOSAL, DUE 2/4

Date	Topic	Reading
2/16 - 2/18	Introduction to the Single General Factor Model Test homogeneity and reliability	Chapter 6 & Reading 2
2/23 - 2/25	Applications of Reliability	Chapter 7

FINAL PROJECT PROPOSAL, DUE 3/3

Date	Topic	Reading
3/1 - 4/5	Simple and Multiple Regression; Identification of Moderator/Mediator/Suppressor Variables Imputation of Missing Data	Notes and Chapter 8

3/3 **MIDTERM EXAMINATION (Chapters 1- 7). I reserved Room 310 of Psychology for our exam from 12:00 – 4:00 pm**

Date	Topic	Reading
3/7 - 3/11	**SPRING BREAK**	
4/7 - 4/12	The common factor model	Chapter 9
4/14 - 4/21	Validity	Chapter 10
4/26 - 4/28	Classical item analysis	Chapter 11
5/3 - 5/3	Introduction to Item Response Theory	Chps 12 - 13 and Reading 3

FINAL PROJECT DUE, MAY 6
FINAL EXAMINATION THURSDAY MAY 12, 1:00 PM - 3:45 PM (Room 310 is reserved)