Psychometric Theory
PSYC 6349

Class Information	Instructor Information
Term: Fall, 2014 (August 21 – December 3) Time: Tuesday/Thursday (3:30 a.m. – 4:50 p.m.) Location: LS Building, Room 420 Credit hours: 3 Websites: www.scielzo.com/ http://elearn.uta.edu	Shannon Scielzo, Ph.D. Office Hours: Tuesdays, 2:00-3:00 p.m., and by appointment. Email: scielzo@uta.edu Office Phone: 817-272-5464

Course Description:

This course is designed to introduce students to Psychometric theory, and provide the basic skills necessary to evaluate the merits of psychological tests and the interpretations of inferences from these measures. Moreover, students should obtain a basic foundation in understanding test development. The material will cover research, theories, and applications of a wide range of psychological testing concepts. For example, we will examine classical test theory views of reliability and item analysis, validity, and test development principles. Moreover, modern approaches to test theory, including item response theory and generalizability theory will be covered.

Course Presentation:

This is a relatively applied course that attempts to teach the basics of psychological testing through hands-on projects, group collaboration, and active participation in class lectures. Thus, in order to maximize learning in this course it is important that everyone participates in class discussion, such as by contributing personal examples or ideas, and by asking questions. It is imperative that the values, questions, and comments presented by other individuals in this classroom be respected. Every individual will bring with him/her unique and diverse perspectives from which we can all benefit.

Student Learning Outcomes:

Upon completion of this course, students will:

- Be able to critically evaluate psychological measurement tools, and the efficacy of measurement approaches
- Have a basic understanding of how to design and implement psychological tests, and to properly measure psychological phenomena
- Have a basic understanding of important theories from the domain
- Be able to use various statistical software programs

Required Texts:

Nunnally, J. & Bernstein, I. (1994) *Psychometric Theory (3rd Ed.).* New York: McGraw Hill.

Allen, M. J. & Yen, W. M. (1979). *Introduction to Measurement Theory.* Long Grove, IL: Waveland Press.

Additional Readings:

AERA, APA, & MCME (1999). *Standards for educational and psychological testing*. Washington, DC: American Psychological Association.

Baker, F. (2001). The basics of item response theory. Eric Clearinghouse on Assessment and Evaluation. College Park, MD: University of Maryland.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*, 281-302.

Cureton, E. E. (1950). Validity, reliability, and baloney. *Educational and Psychological Measurement, 10*, 94-96.

Embretson, S. E. (1996). The new rules of measurement. *Psychological Assessment, 8,* 341-349.

Hays, R. D., Anderson, R., & Revicki, D. (1993). Psychometric considerations in evaluating health-related quality of life measures. *Quality of Life Research, 2*, 441-449.

Messick, S. (1995). Validity of psychological measurement: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50*, 741-749.

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment, 8,* 350-353.

Schmitt, N., & Stults, D. M. (1986). Methodology review: Analysis of the multitrait-multimethod matrices. *Applied Psychological Measurement, 10*, 1-22.

Schwarz, N. (1999). Self-reports: How the questions shape the answers. *American Psychologist, 54*, 93-105.

Shavelson, R. J., Webb, N. M., & Rowley, G. L. (1989). Generalizability theory. *American Psychologist, 44*, 922-932.

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86*, 420-428.

Wanous, J. P., & Hudy, M. J. (2001). Single-item reliability: A replication and extension. *Organizational Research Methods, 4*(4), 361-375.

Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology, 82*(2), 247-252.

Note: Additional readings may be added.

Assessment of Progress Toward Objectives

Exams: There will be two exams, a midterm and a comprehensive final exam. Dates for these exams are listed on the tentative course schedule. Any changes to exam dates will be announced in class, and you are responsible for attending class for such announcements. Exams will cover material from lectures, readings, and any other assignments given. Expect to be able to give advice for good psychometric practice, summarize research, describe controversies, explain key terms, respond to applied problems, explain key formulas, and provide criticism of poor psychometric practice. You are expected to take the in-class exam during the scheduled meeting time and bring needed testing materials (i.e., blank paper and writing utensils). If you have an acceptable absence (as defined by official UTA policy) you may make up the exam. This will consist of completion of an assignment deemed commensurate or more difficult. To invoke this policy, you must

provide documentation of the absence by the Friday following the scheduled exam and you must make up the exam within one week of the scheduled exam. This make-up policy is for highly unusual circumstances only. Failure to follow this policy will result in you receiving a "0" on the exam. You are expected to work independently on exams, and you will be given a course grade of "F" if you fail to behave in accordance with UTA's guidelines on academic integrity.

Test Development Project: You will practice your skills by developing a psychological measure. For the class project, you will be expected to identify a currently unaddressed need in the field of Psychology, and develop a measure (and respective test manual) to address this deficiency. I recommend picking a topic related to some of your current research – many of you may decide to use your measures and data for upcoming projects, theses, and dissertations.

You have two options for this project: You may either actually collect data for validation of your measure, or, you may create fictitious data (that demonstrates support for the use of your measure). However, if the latter route is chosen, the 'validation efforts' demonstrated will need to be substantially more comprehensive (and the majority of the points provided under the general criteria provided below should be addressed). If the former route is chosen, it is imperative that you begin working on your IRB materials as early in the semester as possible.

Below is an outline of the general criteria for the project. You are encouraged to structure your manual to make it as comprehensible as possible depending on your construct - thus, it is likely that you will not follow the order (nor utilize the headings) given below. However, I expect that each of these points be addressed somewhere within your manual (whenever these points are applicable to your construct/methodology). Furthermore, dependent on the construct you are assessing, additional information may be necessary. Be sure when addressing these points that you demonstrate mastery of the topics you are discussing.

- Test Development
    - Test Conceptualization
        - What is the purpose of your measure?
        - What construct will you measure?
            - How does your construct relate to other measures?
            - How does your construct relate to outcome variables?
            - Are there sub-constructs?
            - How does your construct meet an unmet need?
            - Include a nomological network
            - What population should this scale be assessing?
            - What is already known about this construct?
            - Will this scale typically be employed in conjunction with other measures?
            - What are the potential positive/negative implications of using this scale?
            - Include sufficient literature to support your assertions
    - Test Construction
        - How many items did you initially develop, and why?
        - How were items developed?
        - How did you choose to scale your measure, and why?
        - How did you score your scale, and why?

    - Review, Revision, and Tryout

        - Item Tryout
            - How did you test your scale? What methodology(ies) did you employ, and why?
            - What population(s) did you use? Was this consistent with the population to which you hope to generalize your findings?
            - Were expert reviews and bias reviews conducted?
        - Item Analysis
            - How did you go about deciding which items to retain?
            - How were reliability and validity assessed?
            - Explain why the various forms of reliability and validity were chosen
                - Be comprehensive – consider the various issues and concerns that we discuss in class
                - Include an MTMM matrix if applicable
            - Did you have missing data? If so, how did you deal with it?
            - Do you have sufficient domain coverage?
        - Test Revision
            - How many iterations of revisions have you gone through thus far?
            - Did you cross validate your findings?
    - Final Scale
        - How many items did you retain in the 'final' scale?
        - Were additional studies conducted?
        - How do we interpret scores?
        - In some cases, some of the points under the review, revision and tryout section may be more applicable here and vice versa
    - Discussion
        - What are the theoretical and practical implications of your scale?
        - Limitations and Future Research
            - What further plans might you implement to further examine your measure?
            - Thoroughly discuss the limitations associated with the particular approach(es) that you undertook
- Test Materials
    - Include all test materials (e.g., instructions, scale items, etc.)
- References
- Figures/Tables as needed to support your arguments
- General Criteria
    - The manual should be written following APA 6th edition guidelines
    - Include appropriate headings/subheadings to facilitate communication of your ideas
    - The document should be free of spelling/grammatical errors
    - There is no minimum nor maximum page requirement for this project. - However, I expect that your arguments should be well supported.

I am expecting to receive numerous drafts and provide feedback to you for this project, under the understanding that feedback will be provided to you within a two-week period. Failure to seek feedback during the course of the completion of your project will likely result in a lower grade, as you will probably fail to address issues/concerns that I might otherwise have brought to your attention.

Class Assignments and Participation: You are expected to attend every class session, participate in class discussions and activities, and come prepared for class. Coming prepared means that you are ready to discuss the assigned readings (you may be called on at random to summarize and lead discussion on class readings) and have adequately completed any assignments that are due. Furthermore, electronic devices (e.g., laptops, cell phones, tablets, etc.) are not permitted to be used during class, unless otherwise specified. Their use will lead to losing participation credit for the day, and may result in you being asked to leave the class.

If you have missed no more than 1 class activity, you will receive 100% (i.e., the full 20 % of your total grade) for participation. If you miss 2 activities, your assignment and participation grade will be reduced to 75%. If you miss 3 activities, your assignment and participation will be reduced to 50%. If you miss 4 activities, it will drop to 25%. And, if you miss 5 or more, your assignment and participation grade will be 0%. If you must miss a class for a religious holiday/purpose, please notify me know at your earliest convenience.

Quizzes: Quizzes will be periodically administered to assess student learning, covering material from class readings and lectures. Quiz grades will be averaged.

Criteria for Grade:

Midterm Exam	20%
Comprehensive Final Exam	20%
Quizzes	20%
Test Development Project	20%
Class Assignments & Participation	20%

Overall Course Evaluation:

90-100%	= A
80-89%	= B
70-89%	= C
60-69%	= D
0-59%	= F

Course Prerequisites:

Graduate standing or permission of instructor. However, it is recommended that students entering this class have a strong statistical background and be well-versed in psychological concepts/principles.

Student Code of Conduct:

Students who engage in any activities that lead to classroom disruption may be directed to leave the class, may be withdrawn from the class, receive a disciplinary warning, probation, suspension, expulsion, or other appropriate and authorized actions.

Expectations for Out-of-Class Study:

As graduate students, you are well aware that at minimum you should be spending 3-hours studying for every hour in class. However, depending on your various strengths and weaknesses progressing through the various topics covered, you may need to allocate substantially more time. Furthermore, many of the topics build upon learning from previous weeks – thus, you must allocate sufficient time each and every week.

Academic Integrity:

All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Drop Policy:

Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/ses/fao).

Americans with Disabilities Act:

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112 -- The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act - (ADA), pursuant to section 504 of The Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

Student Support Services:

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Student Feedback Survey:

At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Electronic Communication:

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php

Drop for Non-payment of Tuition:

If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office. You may not continue to attend class until your Enrollment Loan has been applied to outstanding tuition fees.

Withdrawal Deadline: The last day to drop this class without academic penalty is ***October 29th***.

Grievances Related to Grades:

It is the obligation of the student, in attempting to resolve any student grievance regarding grades, first to make a serious effort to resolve the matter with the instructor with whom the grievance originated. Individual instructors retain primary responsibility for assigning grades. The instructor's judgment is final unless compelling evidence shows preferential treatment or procedural irregularities. If students wish to appeal, their requests must be submitted in writing on an Academic Grievance Form available in departmental or program offices to the department chair or program director. Before considering a grievance, the department chair or program director will refer the issue to a departmental or program committee of graduate faculty. If the committee cannot reach a decision acceptable to the parties involved, the department chair or program director will issue a decision on the grievance. If students are dissatisfied with the chair or director's decision, they may appeal the case to the academic dean. If they are dissatisfied with the academic dean's decision, they may appeal it to the Dean of Graduate Studies. Students have one year from the day grades are posted to initiate a grievance concerning a grade. (For grievances other than those related to grades, see the catalog entry titled Grievances Other Than Grades).

Final Review Week:

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week ***unless specified in the class syllabus***. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures:

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit (the only exit). When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Syllabus Changes:

I reserve the right to make changes to this syllabus or course schedule according to the learning needs of the class.

Your Success!:

As a final note, it is very important to me that you succeed in this course. I hope that you enjoy this course, successfully complete it, and benefit from the concepts that you learn from it in the future. Please contact me with any concerns or problems that you may have.

Tentative Course Schedule

Date	*Topic*	*A & Y*	*N & B*	*Articles/Other Materials*
Aug. 21	Introduction, Statistical Foundations Review	Ch. *2	Chs. 1 & 5	
Aug. 26/28	Scaling and Test Construction		Ch. 2	Cronbach Cureton Schwarz
Sept. 2/4	Scaling and Test Construction, ***Census Date, Sept. 8***		Ch. 8	*Standards for Educational and Psychological Testing
Sept. 9/11	Reliability	Ch. *4	Ch. 6	Hays Schmitt (1996) Wanous (1997 & *2001)
Sept. 16/18	Reliability Contd.		Ch. 7	Shrout Shavelson
Sept. 23/25	Validity	Ch. *5		Messick Campbell Schmitt (1986)
Sept. 30/Oct. 2	Validity Contd.		Ch. 3	
Oct. 7/9	Review ***Mid Term Exam, October 19th***			
Oct. 14/16	Class Project Update Presentations			
Oct. 21/23	Class Project Update Presentations/ Exam Review			
Oct. 28/30	Special Problems in CTT, ***Oct. 29, Last day to drop***	Ch. 3	Ch. 9	
Nov. 4/6	Recent Developments in Test Theory/IRT	Ch. 11	Ch. 10	Embretson

Nov. 11/13	Recent Developments in Test Theory/IRT Contd.			Baker, Handouts
Nov. 18/20	Factor Analysis/Confirmatory Factory Analysis		Chs. 11 & 12	
Nov. 25	Factor Analysis/Confirmatory Factory Analysis Contd. ***Nov. 27, Thanksgiving Holiday*** ***Review Week: Nov. 25th to Dec. 3rd***		Ch. 13	Handouts
Dec. 2	Genomic Analysis, Special Topics ***Scale Project Due, beginning of class, paper and electronic versions.***			
Dec. 11	***Final Exam,*** ***http://wweb.uta.edu/aao/recordsandregistration/assets/pdf/final_exam_schedule_fall2014.pdf*** Thursday, Dec. 11th, 2:00 - 4:30 p.m.			

Note: * These are optional but suggested readings.