SAM HOUSTON STATE UNIVERSITY
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
DEPARTMENT OF PSYCHOLOGY & PHILOSOPHY

PSYCHOMETRICS

PSYC 5394
Spring 2018

Instructor: James W. Crosby, Ph.D.
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Time: Tuesday/Thursday—2pm—3:20 pm
Classroom: CHSS 249
Office Hours: Thursday—9 to 11am or appt.

COURSE OVERVIEW:

This course is designed to provide psychology graduate students with a theoretical and applied basis for utilizing psychometric concepts within educational and psychological measurement areas. With this foundation, students will have acquired the skills necessary for the selection of valid assessment instruments for use in applied psychological practice. Attention will also be given to instrument development, including a student-developed test construction project.

REQUIRED TEXT

Schultz, K., Whitney, D., & Zickar, M. (2013). *Measurement theory in action: Case studies and exercises*. New York, NY: Routledge.

RECOMMENDED TEXTS

Crocker, L., & Algina, A. (2006). *Introduction to classical and modern test theory*. Belmont, CA: Wadsworth.

DeVellis, R.F. (2016). *Scale development: Theory and applications* (4th ed.). Thousand Oaks, CA: Sage.

PSY 594 OBJECTIVES:

Primary Course Objectives
1. Acquire knowledge on the fundamental principles of psychometric theory, testing, and measurement as related to applied practice.
2. Develop an increased awareness of the ethical issues involved in psychometrics, including the impact of factors such as culture and language.
3. Acquire skills for test construction and validation through the development of a new instrument.

All information on SHSU's Academic and Related Policies can be found at:
http://www.shsu.edu/syllabus/

TIME REQUIREMENT:

In a typical graduate class, for each hour attempted at least three hours outside of class is expected. This 3-credit hour course will meet 3 hours each week, necessitating 9 hours each week outside of class in which to read and complete assignments. Further, additional time will likely be required of you throughout the semester for applied activities that are also essential components of this course. *It is expected that if you enrolled in this course, you can meet the time requirements.*

ATTENDANCE POLICY:

Regular and punctual attendance is expected. SHSU policy is that no student will be penalized for three or fewer hours of absence. However, a student may be penalized for more than three hours of absences. Students may miss one class without penalty to their grade, but missing two classes could result in a failing grade for the class. The three hours of absence provided by university policy should be used carefully for serious illness and emergencies. If a student has a conflict with a scheduled class, he/she must meet with me to determine an appropriate plan of action. It is the student's responsibility to contact the instructor regarding make-up work, and arrangements must be arranged with the instructor PRIOR to the absence.

RELIGIOUS HOLIDAYS:

Section 51.911 (b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for the absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence. "Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20, Tax Code. Please see the link below for additional information.

Observance of Religious / Holy Days
http://www.shsu.edu/dotAsset/0953c7d0-7c04-4b29-a3fc-3bf0738e87d8.pdf

CLASSROOM RULES OF CONDUCT:

Students should review, and adhere to, the Code of Student Conduct and Discipline at https://www.shsu.edu/students/guide/dean/codeofconduct.html. In addition, please turn off **ALL** electronic devices, including cell phones, and keep them in a case and/or totally out of view, unless special arrangements have been made ahead of time with the instructor. Please see the link below for additional information.

University Code of Conduct https://netreg.shsu.edu/mirror/codeofconduct.html

PROFESSIONALISM:

Attendance, punctuality, adherence to standards for appropriate classroom behavior, and the quality and the quality of your academic performance are all related to your observable "professionalism", which in turn, signals your readiness to advance in your degree program.

Please note that *punctuality is a particularly important habit*. It is a show of respect for instructors, peers, and even for your own education. Habitual tardiness is a demonstration of quite the opposite.

ACADEMIC INTEGRITY:

The university expects all students to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action.
The university and its official representatives, acting in accordance with Subsection 5.32, may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating, plagiarism, collusion and the abuse of resource materials. Please see the link below for additional information.

References the University's policy on Academic Dishonesty
http://www.shsu.edu/dotAsset/728eec25-f780-4dcf-932c-03d68cade002.pdf

STUDENTS WITH DISABILITIES:

It is the policy of SHSU that individuals otherwise qualified shall not be excluded, solely by reas on of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs, nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance are expected to visit with the Office of Services for Students with Disabilities located in the Counseling Center (294-1720) . They should then make arrangements with their individual instructors so that appropriate strateg ies can be considered and helpful procedures can be developed to ensure that participation and ac hievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If a student has a disability that may affect adversely his/her work in this class, then the student is encouraged to register with the SHSU Counseling Center and talk with the instructor about how best deal with the situation. All disclosures of disabilities will be kept strictly confidential. NOTE: no accommodation can be made until the student registers with the Counseling Center, and there are *no retroactive* accommodations. Please see the link below for additional information.

Americans with Disabilities Act – Students with Disabilities
http://www.shsu.edu/dotAsset/9edd8433-cad5-40d1-b4bf-6a91b08f90e4.pdf

COURSE REQUIREMENTS:

Class Participation:

ACTIVE class participation is expected. You must be prepared to participate adequately in class, which includes completing the readings and gathering and required research materials. Absences will result in failure to earn class participation points. 65 total points are possible.

Exams:

Two exams (100 points each) will be administered during the course of the semester (i.e., one midterm and one final exam). The items for the exams will be drawn from the readings, lectures, notes, and class discussion. The format will include fill-in-the-blank, short answer, and essay questions.

The midterm exam will be focused on fundamental concepts in psychometrics, scaling, test development, and reliability. The final exam will be focused on the topics of scoring and interpretation, validity, factor analysis, bias in psychometrics, item response theory, and generalizability theory.

Projects/Presentations:

Two major projects are required in this course.

Test Review Paper/Discussion:

First, you are to identify a psychological instrument offered by a major test publisher and elicit *at least* two empirical studies examining the psychometric properties of this instrument. Integration of the test manual should also be *strongly* considered, if available. Once this information is compiled, you are to write a paper critiquing the scientific merit of the instrument. The paper is worth 70 points, while an in-class discussion of your instrument will be worth an additional 15 points (maximum). The total number of possible points for this project is 85.

Test Construction—Paper and Presentation:

In the second project, you will develop, collect data, and validate a new measure. A rubric of expectations will be distributed later in the semester for the "write-up" of this project. As you are likely aware, this project cannot be completed overnight. Therefore, you must work consistently throughout the semester to produce a satisfactory project. In the second week of class (i.e., on 1/25/18), you will be required to have a finalized idea for your project (i.e., *submitted in a written proposal*). Two products will come from this project: 1) a paper (written in APA format) submitted to the instructor discussing the psychometric properties of the scale, among other areas, and 2) a presentation (approx. 15 to 20 minutes) outlining your project, procedures, and the psychometric properties of your scale. Collectively, the components of this project are designed to assess your ability to design an instrument, critically analyze data, write-up the results in a professional manner, and present these results to your peers in an academic forum. Each of these two components is worth 75 points (i.e., total = 150 points).

STUDENT EVALUATION PLAN:

Area	Points Possible
Class Participation (includes attendance and professionalism)	65
Midterm Exam	100
Final Exam	100
Test Construction Project Paper	75
Test Construction Project Presentation	75
Test Review Paper/Discussion	85
TOTAL	***500***

Points Accrued	Grade Assigned
450-500	A
400-449.99	B
350-399.99	C
300-349.99	D
<300	F

INSTRUCTOR EVALUATION:
You will be asked to complete a course/instructor evaluation at a time near the end of the semester.

Please see *Appendix A* for detailed course information.

Course Outline

The course outline is tentative and subject to change. Any changes will be announced in class.

Week	Dates	Topic	Primary Readings[1]	Assignments/Projects Due
1	1/18	Introduction to Psychometrics	**S & W Module 1** DeVellis Ch. 1 C & A Ch. 1	
2	1/23 & 1/25	Statistics Review for Psychometrics	**S & W Module 2** C & A Ch. 2	**Test Construction Project (TCP)** **Idea FINALIZED and Submitted to Instructor (1/25)**
3	1/30 & 2/1	Scaling and Test Development	**S & W Modules 3 & 4** DeVellis Chs. 2 & 5 C & A Chs. 3 & 4	
4	2/6 & 2/8	Scaling and Test Development (continued)	**Crosby (2011)** **Magovcevic & Addis (2008)**	
5	2/13 & 2/15	Reliability	**S & W Module 5 & 6** DeVellis Ch. 3 C & A Chs. 6, 7, & 9	
6	2/20 & 2/22	Reliability: Applications	**Vassar & Crosby (2008)** **Vassar, Hill, & Ridge (2008)**	
7	3/1	**Exam**	**None**	**MIDTERM EXAM**
8	3/6 & 3/8	Scoring and Interpretation	**S & W Module 14** C & A Chs. 17—20	
9	3/20 & 3/22	Validity	**S & W Modules 6—9** DeVellis Ch. 4 C & A Ch. 10	
10	3/27 & 3/29	Validity: Applications	**Joseph & Newman (2010)** **Kuncel et al. (2010)** **De Gieter et al. (2009)**	
11	4/3 & 4/5	**Instrument Reviews**	**None**	**Test Review Discussions—Paper Due**
12	4/10 & 4/12	Factor Analysis	**S & W Module 18** DeVellis Ch. 6 C & A Ch. 13 **Namok et al. (2009)**	
13	4/17 & 4/19	Bias in Psychometrics	**S & W Module 11** C & A Ch. 12 **Konold & Canivez (2010)**	
14	4/24	Item Response Theory	**S & W Module 20** DeVellis Ch. 7 C & A Ch. 15	

[1] Required readings are in **boldface**.

15	4/26 & 5/1	Special Topics	TBA	**TCP Presentation with Handouts**
16	5/3	**TCP Presentations**	**None**	**TCP Presentation with Handouts and Paper Due**
Finals Week		**Exam**	**None**	**FINAL EXAM**

Appendix A

Session Descriptions

Week(s)	Topic	Description[2]
1	Introduction to Psychometrics	Basic terms and concepts, historical origins of measurement, stages of test theory, problems in measurement
2	Statistics Review for Psychometrics	These discussions will focus on statistical and research techniques that are relevant to psychometrics. For many in the course, this will be a review of sorts.
3 & 4	Scaling and Test Development	Understanding constructs/latent variables, path diagrams, parallel tests, approaches to scaling, guidelines for the usage of Likert scaling
5 & 6	Reliability	The concept of the true score → errors of measurement, estimating reliability, procedures requiring one and two test administrations, factor affecting reliability, reliability generalization and reliability induction
7	**Midterm Exam**	
8	Scoring and Interpretation	Scoring methods: conventional, formula, credit for partial knowledge, standard setting, norms, standard scores, controversies related to scoring and interpretation
9 & 10	Validity	Responsible usage of tests, 3 major types of validity, small group activities
11	**Instrument Reviews**	These sessions will be in a presentation/discussion format, in which each student will informally present the results and major findings from their respective papers. Questions and comments will be integrated into each presentation by the students as well as the instructor.
12	Factor Analysis	General factor model, conceptualizing factor analysis, functions of factor analysis, extracting factors, in-class exercises
13	Bias in Psychometrics	Misuses of psychological assessments → public policy issue, sources of error, test adequacy, test manuals, bias vs. fairness, "subgroup norming"
14	Item Response Theory	IRT as an alternative to CTT, terminology, item characteristic curves, the 3PL Model, item discrimination, current application of IRT
15	Special Topics: Faculty/Student Research Projects in Psychometrics	Faculty and/or student projects related to psychometrics will be presented and discussed. Guest speaker.
16	**TCP Presentations**	**Students will present on their instruments. A rubric will be distributed to ensure adequate content coverage.**
Finals Week	**Final Exam**	

[2] Activities will be integrated throughout each week. The type and number will depend on pace and adequate development.