Psychometric Theory - PSYC 6349

Fall 2021

Instructor Information

Instructor	Email	Office Location & Hours
Lauri Jensen-Campbell	lcampbell@uta.edu	Life Science 406 – TR 2:00 – 3:30p** or by Appointment on Teams First Tuesday of Month – No office hours
Office Telephone	**Faculty Profile**	**Graduate Teaching Assistant**
817-272-5191	https://mentis.uta.edu/explore/profile/lauri-jensen-campbell	Kristen Hull TR 12:30p – 1:30p or by Appointment on Teams

General Information

Time and Place of Class of Meetings

Tuesdays and Thursdays – 9:30A – 10:50A. Class will be synchronous on-line via Teams. Class will also be video-taped for students to re-watch at a later time if they so choose.

Description of Course Content

This course focuses on the design and development of scientifically sound measures to be used for theoretical advancement and workplace application. Topics such as classical and modern (e.g., IRT) test theories, reliability, validity, item writing, and factor analysis will be discussed.

Student Learning Outcomes

1) To acquaint you with the fundamental vocabulary and logic of psychological measurement and behavioral assessment.

2) To develop your capacity for critical judgment of the adequacy of measures purported to assess behavior in the role of theory development.

3) To acquaint you with some of the relevant literature in personality assessment, psychometric theory and practice, and methods of observing and measuring behavior.

4) To instill in you an appreciation of and an interest in the principles and methods of psychometric theory in general and behavior assessment in particular.

5) This course is not designed to make you into an accomplished psychometrist (one who gives tests) nor is it designed to make you a skilled psychometrician (one who constructs tests). Rather it is aimed to allow you to understand the fundamental theoretical issues concerning both the psychometrist and the psychometrician (i.e., it is meant to be a starting point).

6) Because modern psychometrics and statistics may be done using open source software such as R, examples will be presented in R in addition to being presented in SPSS/JASP. Instructions for installing and using R for psychometrics are available here.

Course Materials

Required Materials

This course will provide some hands-on experience in psychometric methods in addition to covering theory. As such, students will need access to R/Rstudio, SPSS-X (which is still free to UT Arlington students) and/or JASP (https://jasp-stats.org/download/).

Required Text

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

Furr, R.M. (2021). Psychometrics: An Introduction (4th Edition). Sage: Thousand Oaks, CA.

There may be additional required readings assigned throughout the semester that are not part of your required textbook. They will be provided as PDFs via CANVAS.

Optional Text

Revelle, W. An introduction to psychometric theory with applications in R (under development). The chapters are available as pdfs.

Technology Requirements

You will need access to CANVAS, Teams, and Respondus Lockdown for this course. Students can access tutorials on these tools by clicking on the "Get Started" Box on their Canvas Homepage. You will need a webcam for bother Respondus Lockdown and Teams.

You will also need access to QuestionPro and Sona for your project.

You will need an account on FlipGrid for your project presentation.

REEF Polling: You will need to purchase a license to REEF (https://app.reef-education.com/#/login) and install it on a device that supports a web browser, which you will be bringing to EVERY class and lab. These devices include laptops, iOS, Android and Windows mobile devices. The only device it does not support is a Blackberry. You will be using this application for in-class and in-lab participation, attendance, and weekly quizzes. It is your responsibility to have the application loaded on a device and ready for use by Tuesday, September 7.

Grading Information

Grading

Students are expected to keep track of their performance throughout the semester which Canvas facilitates and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels.

Assignment	Total Points
Midterm	100
Final	100
Project Two-Page Summary/Scales	20
Project IRB Proposal and Documentation	30
Project Technical Report	100
Project Video	30
Participation (Attendance, Participation, Quizzes, HW)	100
Critique of Projects	20
TOTAL POINTS	500

90% - up A 80%-89% B 70% -79% C 65-69% D Below 65

Exams

There will be two examinations. You will be given questions that assess your conceptual knowledge of the concepts that were covered in class. In addition, you may be provided with data sets or printouts and will be required to analyze and interpret the data as it pertains to psychometrics. The exams will be closed-book (no notes, no access to books, or access to other internet sites). You are not allowed to plagiarize materials or consult your classmates when answering questions. Any *academic dishonesty* will result in an F for the semester and being turned into the university.

Exams will be taken in CANVAS with Respondus Lockdown Browser and Monitor. **Respondus LockDown Browser** is a custom browser that locks down the testing environment in CANVAS. **Respondus Monitor**, a webcam feature for LockDown Browser, records students during online, non-proctored exams.

As such, you will need a webcam and the Respondus software downloaded on your computer or use of a lab on-campus that has Respondus. Before you start your exam, you are to hold up your student ID so I can compare the ID to the person taking the exam; you will also do a room scan to ensure that you do NOT have any notes. You CANNOT communicate with other people during the exam. Please stay in your seat until the exam is complete. If an interruption occurs, briefly explain what happened by speaking directly to your webcam. And, finally, remember that you cannot exit the exam until all questions are completed and submitted it for grading. All exams will be graded anonymously. As such, please do not put any identifiers in your answers or in your file names. Students may not get the same questions (i.e., they will be pulled from a pool of questions) so providing answers to fellow students will not be helpful (and is academic dishonesty).

Psychometrics Project

You will work individually or in groups of 2 to 4 (your choice) to develop a novel scale measuring a construct of professional interest to you. It CANNOT be data that you have already collected. This proposal should include a thorough literature review of your construct and general steps for how you plan to execute the scale development process. After receiving feedback from Dr. Jensen-Campbell or Kristen Hull, you will then execute the steps outlined in your proposal. For your final project, you will develop a technical report discussing the relevant literature, scale purpose, item-writing and pilot-testing procedures, final scale, and analyses. Lastly, you will present a summary of your process and scale to your classmates in a 10-minute video that each group can review and critique. *You will need to leave time to get IRB approval to collect data given you may want to use this data for generalizable knowledge in the future so plan ahead.*

Participation

You will also be required to participate in class. All students are responsible for reading the assigned materials *prior* to class and coming to class prepared to discuss the materials. As such, participation will be assessed in four ways.

1. You may have quizzes over the readings and/or class lectures.

2. We will use the polling throughout the semester to assess your individual participation/knowledge in each class.

3. There will be in-class group discussions. You will be breaking out into smaller groups to discuss topics and/or complete assignments and then report back to the class what you decided/discussed.

4. The final form of participation will be several homework assignments. You will have several out-of-class assignments to complete throughout the semester to enhance your knowledge of the material.

The overall participation grade will be graded out of percent correct. For example, only students who get 100% of their participation (from attendance, quizzes, HW, and group discussions) will receive the full 100 points. Students who have a quiz average of 95% will receive 95 points, and so forth. Obviously, some participation assignments may be weighted more than others.

Make-up Policy

There are no make-ups for in-class assignments, homework, participation, or quizzes. If you miss an assignment, you will receive a 0 for that assignment.

Expectations for Out-of-Class Study

A general rule of thumb is this: for every credit hour earned, a student should spend 3 hours per week working outside of class. Hence, a 3-credit course might have a minimum expectation of 9 hours of reading, study, etc. Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 2-3 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc. given this is a graduate course.

Grade Grievances

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog.

Institution Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Additional Information

Attendance

At the University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance.

As the instructor of this section, I have established the following attendance policy: Attendance is MANDATORY. It is your responsibility to attend the ENTIRE class and ***not be late***. This is NOT a correspondence course (i.e., a distance education course); thus, you are expected to be in class and to participate in class. There is no distinction between excused and unexcused absences in the class. You are either present or you are not present. Excessive absences for any reason will adversely affect your grade.

However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381.

Library Information

Research or General Library Help

Ask for Help

- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources

- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#!/course_reserves)

Study Room Reservations (openroom.uta.edu/)

Exam and Project Schedule

As the instructor for this course, I reserve the right to adjust this exam schedule in any way that serves the educational needs of the students enrolled in this course. -Lauri A. Jensen-Campbell.

Date	Subject
September 17	Detailed 1-2 page summary, proposed scales, and group composition
October 8	IRB protocol submission for project. Remember to include possible scales for discriminant and convergent validity if you are creating a scale.
Opens 10/22 until 10/29	**MIDTERM** - All Material covered up until 10/22 – you will have 1.5 hours to take the midterms once you start it.
December 3	Final Reports/Manuals and Videos are due via Flipgrid (You can tape in Teams and it saves to Stream where you can edit)
December 10	Last Day to review and critique each other's projects using the rubric provided.
Tuesday, December 14 – 8:00a – 10:30a	**FINAL**

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Week	Topic	Reading
8/26 - 8/31	Introduction	Furr – Chapter 1; Devellis – Chapter 1
9/2	IRB Presentation	Review Form 1
9/7-9/9	Scale Development/Scaling	Furr – Chapters 2 & 10; Devellis – Chapter 5 Goddard III & Villanova (1996); Schwarz (1999); Ickes et al (2019)
9/14-9/16	Understanding Latent Constructs	Devellis – Chapter 2
9/21-9/23	Individual Differences and Correlations	Furr – Chapter 3
9/28-9/30	Test Dimensionality and Factor Analysis	Furr – Chapter 4; Devellis – Chapter 6 *Fields – Chapter 18 *Tabachnick & Fidell – Chapter 13
10/5-10/7	Reliability: Conceptual Basis	Furr – Chapter 5
10/12-10/14	Reliability: Empirical Estimates	Furr – Chapter 6 DeVellis – Chapter 3
10/19-10/21	The Importance of Reliability	Furr – Chapter 7
10/26-10/28	Validity: Conceptual Basis	Furr – Chapter 8 Devellis – Chapter 4
11/2-11/4	Estimating and Evaluating Convergent and Discriminant Validity	Furr – Chapter 9; Devellis – Chapter 6; Campbell & Fiske (1959)
11/9-11/11	Generalizability Theory	Furr – Chapter 13
11/16-11-18	Item Response Theory	Furr – Chapter 14; Devellis -Chapter 7
11/23	Dr. Schroeder	
11/25	Thanksgiving	No Class
11/30-12/2	Test Bias	Furr – Chapter 11
12/7	Catch-Up Day	

Readings:

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait- multimethod matrix. Psychological Bulletin, 56(2), 81-105. doi:10.1037/h0046016

Ickes, W., Babcock, T. et al. (2019). Side Streets and U-Turns: Effects of Context Switching, Direction Switching, and Factor Switching on Inter-item Correlations and Misresponse Rates. Journal of Personality Assessment, 101(3) 326-339

Schwarz, N. (1999). Self-reports: How the questions shape the answers. American Psychologist, 54(2), 93-105. doi:10.1037/0003-066X.54.2.93