RUTGERS
Graduate School of Education

Department of Educational Psychology
Graduate School of Education
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Psychometric Theory I
15:291:515:90
Fall 2021
3 Credits

Instructor: Dr. John Kerrigan	**E-mail**: johnkerr@math.rutgers.edu
Office Hours: By arrangement	**Location:** Online via Canvas
Mode of Instruction: ___ Lecture ___ Seminar ___ Hybrid _X_ Online ___ Other	**Permission required**: _X_ No __ Yes

Course overview: This course is designed to provide an overview of basic but important topics and issues in educational and psychological testing and measurement. The course will cover psychological and statistical principles underlying test design, analysis, and interpretation with emphasis on classical psychometric theory; analysis of reliability and validity and their estimation; the development, analysis, and use of both norm-referenced and criterion-referenced tests; and introduction to scaling techniques.

Course goals: After successfully completing this class students should achieve the following goals:

Goal 1. Understand the fundamental concepts, methods, and principles of educational and psychological measurement. Specific objectives are as follows:
1.Understand the purposes and methods of score transformation, conduct the score transformation, and interpret results.
2. Learn how to obtain evidence for the validity and reliability of assessments.
3. Understand the general procedures for test construction and item development.
4. Learn how to use item level data to evaluate items and to create reliable and valid tests.

Goal 2. Be more measurement literate. That is, be able to read, interpret, and critically evaluate measurement methodology, reported outcomes and subsequent interpretations, as found in educational or behavioral research journals.

Course materials: *Required materials offered to you via Canvas at no cost:*

Abbott, M. L. (2011) *Understanding Educational Statistics Using Microsoft Excel and SPSS*. Hoboken, NJ: John Wiley & Sons, Inc.

Allen, M. J. & Yen, W. M. (2002). Introduction to Measurement Theory. Prospect Heights, IL: Waveland Press.

Crocker, L. & Algina, J. (1986). Introduction to Classical & Modern Test Theory.

Wilson, M. (2005). Constructing Measures: An Item Response Modeling Approach.

Thorndike, R. M. (2005). Measurement and Evaluation in Psychology and Education. (7th ed.).

Software: MS-EXCEL (or Google Sheets) and SPSS for Windows (version 19 or newer) are required. To get access to SPSS, Rutgers University provides a free virtual computer lab (https://labgateway.rutgers.edu/#/).

Academic integrity: I expect that you will comply with standards of academic integrity (that is, you will not even think about cheating) in this course. If you need assistance in understanding an assignment or course content, please seek assistance from other appropriate resources or me. Assignments, however, should be your own work, except in cases where I have required a group product. The consequence for violating policies of academic integrity and other elements of the student code of conduct are serious and can have a tremendous negative impact on your academic progress and future career. You should not turn in the same work in two separate classes without the specific written approval of the faculty members involved. Leaving work until the last minute can increase the temptation to plagiarize work from journals or "borrow" friends' work. You can avoid problems by getting your work done early. The Office of Student Conduct supervises issues related to violations of academic integrity (see http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers). Please familiarize yourself with the university policy on academic integrity. See also the resources available for students at http://academicintegrity.rutgers.edu/resources that will help you understand violations of academic integrity.

Office of Disability Services: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.

Features of an online course: An online course differs from a traditional face-to-face course in a number of ways. In particular, for this class:
A. There is a strong emphasis on student-driven learning. The instructor's role is of overall facilitator and coordinator.
B. You will be able to work at your convenience. But it is important to be seriously engaged at least five days during each and every week. This is quite different from a traditional course, in which it is perfectly fine to prepare the day before, go to class the day of class, and then not think about the course the other five days a week.
C. We focus on asynchronous rather than synchronous activities. This course will—officially—be all asynchronous.
D. Students do more of the integrative work than in a face-to-face class. This is likely to support long-term memory development.

Each weekly set of activities and readings will run from **Tuesday to Monday night**. As mentioned in part (B), it is expected you will be logging in and contributing to the course dialogue and activities at least five days during each and every week.

Characteristics of successful online learners: Accounts of the general characteristics of the "successful" online learner are ubiquitous. The studies below synthesize research findings about learning online that may be of use to you in this online course.

Smith, Murphy, and Mahoney (2003) recommended that online learners:

1. Use past experiences to develop new learning.
2. Be motivated by intrinsic rather than extrinsic factors.
3. Set their own goals for learning.
4. Evaluate and monitor their own learning.
5. Develop a problem-solving approach.
6. Select their own learning strategies and materials.

Roper (2007) surveyed successful post-secondary online learners directly (those receiving a grade of 3.5 or better) to determine what they would recommend to other students. Among the skills and actions recommended by students were:

1. Developing a time-management strategy.
2. Being active in online discussions.
3. Using the materials, or finding a way to apply newly-learned concepts.
4. Asking questions.
5. Staying motivated.
6. Sharing what works best for you with the instructor.
7. Making connections with other students.

Course Grading

50% - Weekly Canvas activities (problem sets, discussions, Playposit videos): Each week you will be responsible for completing reading along with either a discussion response, written assignment to upload, videos to watch, and/or some other type of activity. These weekly activities will be scored on a rubric and graded for accuracy and completion.

I will offer corrections and feedback on non-discussion board assignments if they are submitted by Saturday of each week. I will make time every Saturday to review what has been submitted and provide feedback.   You will then have until Monday night to submit again to earn the most credit possible.

25% - Midterm exam: There will be one midterm exam given midway through the course.   More details to follow.

25% - Final project: You will have a final project for this course where you complete a full item analysis on a class-developed assessment. This assignment will be done in groups of two or three students. More details to follow.

Tentative Schedule of Learning Activities:

All readings, materials, and assignments will be placed on a weekly Canvas page.

Week	Course Topics	Reading
1 (9/1-9/7)	Course introduction, testing	
2 (9/7-9/13)	Basic statistical concepts part 1	Allen & Yen, Chapter 2
3 (9/14-9/20)	Basic statistical concepts part 2	Abbot, Chapters 5 & 6; Crocker & Algina, Chapter 5
4 (9/21-9/27)	Normal distribution	Abbot, Chapter 7
5 (9/28-10/4)	Transforming test scores and scales	Allen & Yen, Chapters 7 & 8; Abbott, Chapter 8
6 (10/5-10/11)	Measurements	Allen & Yen, Chapter 3
7 (10/12-10/18)	Constructs	Wilson, 2005 (pg. 1-40)
8 (10/19-10/25)	**Midterm Exam**	
10 (10/26-11/1)	Reliability	Allen & Yen, Chapter 4
11 (11/2-11/8)	Validity	Allen & Yen, Chapter 5
12 (11/9-11/15)	Test development and item analysis	Allen & Yen, Chapter 6; Ostelrind, Chapter 8
13 (11/16-11/22)	Writing multiple-choice items	Popham
14 (11/23-11/29)	Student Growth Percentiles (SGPs)	Resources from NJDOE
15 (11/30-12/6)	Test critique	n/a
16 (12/7-12/13)	**Final Project**	**n/a**