

Psychometric Theory I Online
15:291:515:90
Spring 2016
3 Credits

Instructor Name: Youngsuk Suh	Email: youngsuk.suh@gse.rutgers.edu
Phone Number: 848-932-0829	10 Seminar Pl Rm 323
Lecture: Mondays	Exercise activity: Thursdays
Office Hours: by appointment	Prerequisites or other limitations: <i>Statistical Methods in Education I</i> (15:291:531) or the equivalent
Mode of Instruction: <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Hybrid <input checked="" type="checkbox"/> Online <input type="checkbox"/> Other	Permission required: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Directions about where to get permission numbers: Contact the instructor.

Learning Goals

Program goals: The master's of education degree in Educational Statistics, Measurement and Evaluation aims to provide students training in basic and intermediate statistical, measurement, and evaluation methods. It serves as a preparation for students interested in working in research institutions, and pursuing Ph.D. studies in educational statistics and measurement or a related field. The Ph.D.in Statistics and Measurement within the Learning, Cognition, Instruction, and Development concentration prepares students to become statisticians and psychometricians with broad expertise in applied statistics, measurement theory, educational assessment and statistical analysis. An important feature of the program is early exposure to research and active learning through a variety of course offerings.

Course goals:

This course is designed to provide an overview of basic but important topics and issues in educational and psychological testing and measurement. The course aims to offer fundamental knowledge and techniques required to analyze educational and psychological tests from the perspective of psychometrics.

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:

- a. Understand the purposes and methods of score transformation, conduct the score transformation, and interpret the results
- b. Be able to obtain and interpret reliability and validity related evidence
- c. Understand the general procedures for test construction and item writing

- d. Be able to conduct an item/test analysis from the classical test theory perspective
- e. Understand the general principles of the item response theory and its applications

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 Catalog Description

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.

Class Materials/ Textbooks

Required texts:

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

Recommended:

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.).

Other Description of Course Methods

Basic statistical knowledge is required throughout the course because some issues in the field are necessarily technical.

Calculator: A calculator that performs basic operations is necessary for homework assignments, exercises, and exams.

Email & eCollege Access:

Efficient communication is the key to evaluate how successful an online course is and in this course, **emailing** and **eCollege** are the two communication tools that we heavily rely on. To maximize teaching and learning effects, you have to check your email account frequently and make sure you are able to read information, download files, drop

messages, do homework, and access your grades from our webpage. All information and activities are time sensitive. Late responses and requests will not be handled. For example, you will have a run of time to finish each homework assignment. However, you will not be able to access the homework questions after the designated time.

Grading Policy

Final letter grade will be assigned as follows:

Final Score	Letter Grade
90% and Above	A
80%-89.99%	B+
75%-79.99%	B
65%-74.99%	C+
60%-64.99%	C
55%-59.99%	D
Below 55%	F

Assignments and Requirements

1. **Exams:** There will be two exams, midterm and final, which are worth 30% and 30% of the final grade, respectively.
2. **Homework assignments:** Approximately 4 homework assignments, worth 20% of the final grade, will be given during the semester. You have a whole week to work on a homework assignment. No late homework assignment is acceptable. Please refer to the “Course Schedule.”
3. **Final Report:** A report/critique from a self-selected journal paper that applies the theories and techniques covered in the course is worth 20% of the final grade. The final report/critique is due on April 29th. More detailed information about the final report will be distributed.
4. **Online exercise activities:** Approximately 8 exercises will be given throughout the semester, but will not be graded. The exercises are designed to help you understand the contents covered by lectures. Therefore each exercise will be posted on Thursdays along with the answers. Discussion will be expected through the Dropbox function.
5. **Extra handouts or readings:** Depending on your questions and feedback, extra handouts or reading materials will be posted in addition to the regular lecture notes. These materials are designed to explain difficult concepts covered in the lecture notes or help you better understand the topic for each week.
6. **Reading assignments:** Assigned readings must be completed prior to each lecture.
7. **Participation:** Your participation is expected throughout the semester.

Online Sessions

Online sessions in this course are analogous to office hours in a regular course. Online sessions are not held for getting through the entire notes, but for explaining important concepts in the notes and demonstrating how to solve challenging problems in the notes (and homework assignments) or extra problems.

Discussion Sessions

In addition to the online sessions, an alternative to find the solution of your question is to simply post your questions online. A Basket labeled Question Box will be created every week for you to drop content-related questions. Your questions will be answered on a daily basis (**weekdays during the daytime**). Some of your questions can also be handled in online sessions. Therefore, please make sure you are familiar with the function, Dropbox.

Academic Integrity Policy

The Office of Student Conduct supervises issues related to violations of academic integrity (see <http://academicintegrity.rutgers.edu>). Please familiarize yourself with the university policy on academic integrity at <http://academicintegrity.rutgers.edu/academic-integrity-policy>

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>.

Course Schedule

The following class schedule is subject to change if necessary. Reading assignments must be completed each week.

Week	Topics to be Covered	Readings
Jan 19-Jan 23	Getting Started	
Jan 24-Jan 30	Introduction; Basic Statistical Concepts	Ch. 1 & 2
Jan 31-Feb 6	Transforming; Scaling; Equating	Ch. 7 & 8
Feb 7-Feb 13 Feb 9	Classical Test Theory *HW 1 assigned	Ch. 3
Feb 14-Feb 20 Feb 15 Feb 16	Reliability * HW 1 due *HW 2 assigned	Ch. 4
Feb 21-Feb 27 Feb 22	Reliability; Preparation for Midterm * HW 2 due	Ch. 4
Mar 5	Midterm Exam (starts at 7pm)	
Mar 6-Mar 12	Validity I	Ch. 5
Mar 13-Mar 20	Spring Break (No Class)	
Mar 21-Mar 26	Validity II	Ch. 5
Mar 27-Apr 2 Mar 29	Test Construction; Item Writing *HW 3 assigned	Ch. 6, Handouts
Apr 3-Apr 9 Apr 4 Apr 5	Item Analysis * HW 3 due *Final Project assigned	Ch. 6
Apr 10-Apr 16	Item Response Theory I	Ch. 11.5-11.6, Handouts
Apr 17-Apr 23 Apr 19	Item Response Theory II; Criterion-referenced Test vs. Norm-referenced Test *HW 4 assigned	Ch. 11.7-11.9 Ch. 10.5, Handouts
Apr 24-Apr 30 Apr 25 Apr 29	Review; Preparation for Final Exam * HW 4 due * Final Report Due	
May 7	Final Exam (starts at 7pm)	