

Psychometric Theory I
15:291:515:01
Fall 2015
3 Credits
Wednesday, 4:50 – 7:30 PM
Room 113, Murray Hall

Instructor Name: Youngsuk Suh	Email: youngsuk.suh@gse.rutgers.edu
Phone Number: 848-932-0829	10 Seminar Pl Rm 323
Office Hours: Wednesday 1:30 - 2:30 PM or by appointment	Prerequisites or other limitations: <i>Statistical Methods in Education I</i> (15:291:531) or the equivalent
Mode of Instruction: <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Hybrid <input 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.).

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 in-class exams (midterm and final) and one take-home exam. They will be worth 30%, 30%, and 20% of the final grade, respectively. The exams may consist of multiple choice items, computations, and short answer/essay

questions.

2. **Presentation:** A short presentation, worth 20% of the final grade, will be held at the end of the semester. Each student selects and presents a journal paper in which skills that we learn in class were employed. More detailed information about the presentation will be distributed.
3. **Homework assignments and in-class work activities** will be given throughout the semester. The answers will be either posted on the course website or discussed during class.
4. **Reading assignments:** Assigned readings must be completed prior to each lecture.
5. **Attendance:** Your attendances at the meetings are expected during the semester. Please bring any necessary planned absences to my attention ahead of time.

Other Description of Course Methods

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

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

Course Web Site

Class handouts used by the instructor will be available on Sakai web site at <http://sakai.rutgers.edu> under *15:291:515 F15 PsyTheory*. They will be made available by 8AM each class day. It is your responsibility to print them out if you want to have hard copies in class. The handouts provide a skeleton of what is being covered each day and will thus be an incomplete version of the material actually covered.

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
Sep. 2	1. Course Overview; Introduction	Ch. 1
Sep. 9	2. Basic Statistical Concepts	Ch. 2, Handouts
Sep. 16	3.1. Transforming; Scaling; Equating	Ch. 7 - 8, Handouts
Sep. 23	3.2. Criterion-Referenced Test and Norm-Referenced Test 4. Classical Test Theory Take-Home Exam (covers topics 1 - 3.2)	Ch. 10.5 Ch. 3
Sep. 30	5. Reliability Take-Home Exam due	Ch. 4, Handouts
Oct. 7	5. Reliability 6. Validity	Ch. 4 Ch. 5
Oct. 14	6. Validity Review Session	Ch. 5
Oct. 21	Midterm exam (covers topics 4 – 6)	
Oct. 28	7. Test Construction; Item writing and Attitude Scales	Ch. 6, Handouts
Nov. 4	8. Item Analysis	Ch. 6
Nov. 11	9. Item Response Theory	Ch. 11.5-11.8 Handouts
Nov. 18	Presentation	
Nov. 25	Thanksgiving -- No class	
Dec. 2	10. IRT Applications	Ch. 10.9, Handouts
Dec. 9	11. Issues in Ability Testing; CAT and Bias	Ch. 10.9, Handouts
Dec. 16	Final exam (covers topics 7 - 11)	