

**Fall 2016**  
**Psychometric Theory I Online**  
**15:291:515:90**  
3 Credits  
Online- <http://ecollege.rutgers.edu>

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Phone Number: 848-932-0829	Office: 10 Seminar Pl GSE Rm 323
Lecture: Mondays	Online Session: 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 take-home 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.
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 December 3<sup>rd</sup>. More detailed information about the final report will be distributed later.
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 Mondays along with the answers. Discussion will be expected through the Question Box.
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 or homework assignments. Voice-recorded sessions will be uploaded on every Thursday.

## **Question Box**

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
Sep 6-Sep 10	Getting Started	
Sep 11-Sep 17	Introduction; Basic Statistical Concepts	Ch. 1 & 2
Sep 18-Sep 24	Transforming; Scaling; Equating	Ch. 7 & 8
Sep 25-Oct 1 Sep 27	Classical Test Theory *HW 1 assigned	Ch. 3
Oct 2-Oct 8 <b>Oct 3</b> Oct 4	Reliability *HW 1 due *HW 2 assigned	Ch. 4
Oct 9-Oct 15 <b>Oct 10</b>	Reliability; Preparation for Midterm *HW 2 due	Ch. 4
<b>Oct 22</b>	<b>Midterm Exam</b> (starts at 7pm)	
Oct 23-Oct 29	Validity I	Ch. 5
Oct 30-Nov 5 Nov 1	Validity II *HW 3 assigned	Ch. 5
Nov 6-Nov 12	Test Construction; Item Writing	Ch. 6, Handouts
Nov 13-Nov 19 <b>Nov 14</b> Nov 15	Item Analysis *HW 3 due *Final Project assigned	Ch. 6
Nov 20-Nov 26	Thanksgiving -- No Class	
Nov 27-Dec 3 <b>Dec 3</b>	Item Response Theory I *Final Report Due	Ch. 11.5-11.6, Handouts
Dec 4-Dec 10  Dec 6	Item Response Theory II; Criterion-referenced Test vs. Norm-referenced Test *HW 4 assigned	Ch. 11.7-11.9 Ch. 10.5, Handouts
Dec 11-Dec 16 <b>Dec 12</b>	Review; Preparation for Final Exam *HW 4 due	
<b>Dec 17</b>	<b>Final Exam</b> (starts at 7pm)	