

Item Response Theory
16:300:687:01
Fall 2015
3 Credits

Instructor: Jimmy de la Torre	Day & Time: Monday, 7:40–10:20 PM
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Email: j.delatorre@rutgers.edu	Office Hours: Monday, 6:30–7:30 PM, or by appointment
Mode of Instruction:	
<input checked="" type="checkbox"/> Lecture	<input type="checkbox"/> Hybrid
<input type="checkbox"/> Seminar	<input type="checkbox"/> Online

Learning Goals: The goals of the course are to help students

- 1) understand the principles of item response theory (IRT) as a modern and comprehensive psychometric framework;
- 2) be familiarized with some of the most common IRT models;
- 3) recognize various practical educational and organizational testing applications of IRT; and
- 4) implement commercial and noncommercial software packages for IRT analysis.

Course Catalogue Description:

Introduction to IRT, which encompasses a group of probabilistic measurement models widely used in standardized testing programs. Foundations and assumptions underlying IRT, comparison of various IRT models, application of IRT to practical testing situations, and implementation of IRT using BILOG and other computer programs.

Class Materials/ Textbooks:

de Ayala, R. J. (2009). *The theory and practice of item response theory*. New York: Guilford.
DeMars, C. (2010). *Item response theory*. New York: Oxford University Press.

Grading and Activities:

- 1) Exam: There will be one take-home exam worth 40% of the final grade. The exam will cover materials from the class lectures, homework and reading assignments.
- 2) Homework assignments: Homework assignments (worth 30% of the final grade) will be given throughout the semester. The problems are designed to help you further understand and apply the theoretical concepts covered in class.

- 3) Project: An individual or group paper illustrating the principles and applications of IRT will be required. Projects can be selected from a wide range of topics, and can vary from computer simulations to analyses of your own or existing data sets. A one-page project proposal must be submitted around the middle of the semester. Prior to the project submission, which will be on the last day of the class, the project will be presented in class. As a whole, the project is worth 30% of the final grade.

Final letter grade will be assigned as follows:

Final Score	Letter Grade
90% and Above	A
80%-89%	B+
75%-79%	B
65%-74%	C+
60%-64%	C
Below 60%	F

Web Site: eCompanion (rutgersonline.net)

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/files/documents/AI_Policy_2013.pdf

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.

*Note: For the reading assignments **A** refers to de Ayala, R. J. (2009), whereas **M** refers to DeMars (2010), and **S** refers to supplementary articles (to be provided later).*

Week	Date	Topic	Reading Assignment
1	9/8	Background	A1, 2a; M1 (pp.3-9)
2	9/14	IRT Models	A5a, 6a, 8a, 10a; M1 (pp.9-30)
3	9/21	Metric of Scale	A5b, 6b; M1 (pp.19-21), M2 (pp.32-34)
4	9/28	Ability Parameter Estimation	A4a, Appendix A; M4 (pp.61-65; 106-108)
5	10/5	Item Parameter Estimation	A3, 4b, Appendix B; M4 (pp.65-68)
6	10/12	Using BILOG	
7	10/19	Assessing Model Fit	A5b, 6b; M3
8	10/26	Item and Test Information Functions	A5b, 6b; M4 (pp.80-85)
9	11/2	Test Construction/Test Equating	A11
10	11/9	Midterm Exam (Take Home)	
11	11/16	Differential Item Functioning	A12; S1
12	11/23	Computerized Adaptive Testing	D-Appendix D; S2
13	11/30	Cognitive Diagnosis Modeling; Markov Chain Monte Carlo (I)	S3; S4
14	12/7	Project Presentation	
15	12/14	Markov Chain Monte Carlo (II); R; Project Submission	S5