**Item Response Theory (987C8)**

**Course Outline**
This course will introduce item response theory, and how it differs from classical test theory. It will cover 1-parameter (Rasch) models, 2-parameter logistic and 3-parameter logistic models for binary data and the graded response model, partial credit model and nominal response model for polytomous data.

**Learning Outcomes**
By the end of the course a successful student should be able to:
1. Understand the principles behind one-, two- and three- parameter logistic models for binary response data
2. Understand the principles behind graded response, partial credit and nominal response models for polytomous response data
3. Be able to fit these models to data using appropriate statistical software, and interpret the output.

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**Assessment**
Assessment will be by an exercise in which you analyse and write-up some results.

**Reading (*denotes core text)**

**Core texts**


**Introductory Reading**


See also Yu’s the online demo at:
http://www.creative-wisdom.com/multimedia/IRTTHA.htm

Additional reading


Web resources
http://echo.edres.org:8080/irt/

See Lesa Hoffman’s web page on latent trait models (includes podcasts of her lectures):
http://psych.unl.edu/psycrs/948/index.html

Course Outline

Lecture 1: Generalized Linear Models and Logistic Regression
- Generalized linear model for binary outcomes – logit link function
- Logit model
- Maximum likelihood estimation of logit model
- Assessing model fit
- Probit models
- Multinominal model

Lecture 2: One-parameter (1PL) or Rasch Models for Binary Outcomes
- One parameter logistic (1PL) model or Rasch model
- Introduction to BILOG-MG

Lecture 3: Two-parameter (2PL) and Three-parameter (3-PL) IRT Models
- Two-parameter (2PL) Model
• Model identification
• Three-parameter (3PL) Model
• Normal ogive models

Lecture 4: Estimation and Evaluation of IRT Models
• Marginal maximum likelihood estimation
• Estimating the latent trait: ML, MAP and EAP scoring
• Item and test information
• Testing model fit

Lecture 5: Polytomous IRT Models
• Graded response model
• Use of MULTILOG
• Partial credit models
• Nominal response models

Assignment
Assessment will be by an exercise in which you analyse and write-up some results.