

## PSYCH 540 - PSYCHOLOGICAL MEASUREMENT II

**Instructor:** D.G. Bonett

**Prerequisites:** PSYCH 440 (or equivalent), STAT 401 (or equivalent), working knowledge of SAS or SPSS

**Text:** Crocker, L. & Algina, J. (1986) *Introduction to Classical & Modern Test Theory*. HBJ

### **Topics:**

*Review of statistics concepts:* Populations and samples; probability models; normal and binomial distributions; random variables; univariate and bivariate expectations and moments; estimators of mean, standard deviation and correlation; sampling distributions; interval estimation; sample size requirements. (Chapters 1-2)

*Test construction:* measurement scales; item response formats; domain sampling; scoring schemes; pilot testing methods; norms and standard scores. (Chapters 3-5, 19)

*Classic reliability theory:* true score model and assumptions; reliability coefficient; standard error of measurement; proofs of basic results; test-retest reliability; interrater reliability; estimating true scores; Spearman-Brown formula; reliability of a difference score; strictly parallel, parallel, and tau-equivalent measurements. (Chapters 6-7)

*Generalizability theory:* G-studies and D-studies; single and multiple factor (facet) designs; absolute and relative decisions; generalized reliability coefficients. (Chapter 8)

*Special topics in reliability :* reliability assessment for criterion-referenced tests; intraclass correlations from one-way and two-way random effects ANOVA models; consistency and agreement measures of reliability; sample size requirements for reliability assessment. (Chapter 9)

*Validity concepts:* content, criterion, and construct validity; bivariate and multiple correlation validity evidence; group-difference validity evidence; factor analytic validity evidence; sample size requirements for validity studies. (Chapters 10-11)

*Classic item analysis:* item difficulty; item reliability and validity; item-total correlation; item-deletion analyses; item bias analyses; biserial and tetrachoric correlations. (Chapters 14,16)

*Item response theory:* item response models; local independence; item information function; logit and probit models; one-two-, and three-parameter models; parameter estimation; multidimensional item response models (Chapter 15)

*Computer adaptive testing:* basic concepts and applications; methods for sequential item selection; updating ability and standard error estimates; content balance; internet applications and issues.

*Introduction to structural equation models:* latent variable regression models; parameter estimation; model assessment methods; assumptions and effects of violating assumptions; common misuses.

### **Grading:**

A total of 100 points may be earned on the midterm (week 7) and final comprehensive examination (week 16). A total of 50 points may be earned on each of the two projects. Examinations are closed-book/notes.