Course Syllabus
Advanced Measurement Theory and Application: Part I
EPsy 8222; 4 credits
Tuesday & Thursday (11:15am – 12:30pm), Wednesday (2:00 – 4:00pm)

Adisack Nhouyvanisvong
Educational Psychology
E-mail: nhou0001@umn.edu
Phone: (612) 624-1327

Office hour: 1 – 2 pm Wed & by appt.
Office location: 210G Burton Hall

FAX: (612) 624-8241

College of Education & Human Development Mission Statement
The mission of the College of Education and Human Development is to generate knowledge about teaching, learning, and human development, and to apply that knowledge to improve education for all individuals.

Department Mission Statement

Educational psychology involves the study of cognitive, emotional, and social learning processes that underlie education and human development across the lifespan. Research in educational psychology advances scientific knowledge of those processes and their application in diverse educational and community settings. The department provides training in the psychological foundations of education, research methods, and the practice and science of counseling psychology, school psychology, and special education. Faculty and students provide leadership and consultation to the state, the nation, and the international community in each area of educational psychology. The department's scholarship and teaching enhance professional practice in schools and universities, community mental health agencies, business and industrial organizations, early childhood programs, and government agencies.

Course Description
This is a two-part course. The Instructor for Part 1 (January 17 through March 15) is Dr. Adisack Nhouyvanisvong. Part 1 will cover classical test theory, generalizability theory, item fairness (differential item functioning), equating, and dimensionality. Essentially, the first part covers theories and methods dealing with observed scores, whereas the second portion covers theories and methods dealing with latent variables.

The Instructor for Part 2 (March 19 through May 4) is Professor David J. Weiss. The latter portion of the course will cover item response theory and its applications. A separate reading list will be distributed for this portion of the course.

This course is designed for graduate students in education, psychology, and the social sciences who want a background in more advanced measurement theory and methods used in those fields.   In the area of theory, the course covers classical test theory, factor models of test items, generalizability theory, and item response theory. Applications include advanced techniques in test construction, the analysis of rating data, test equating, and differential item functioning (item fairness). Lecture sessions include a combination of lecture and student discussion. Labs include hands on application of computer software used in measurement applications.

Course Goals

The goal is to acquaint students with cutting edge models in test theory and with the application of computer software with which to implement those theories. . After completing the course, students should be prepared to begin working on advanced applications of measurement in education and the behavioral sciences.

Textbooks and Materials

McDonald, R. P. (1999). *Test Theory: A Unified Treatment.* Mahwah, NJ: Erlbaum.

Embretson, S. E. & Reise, S. P. (2000). *Item Response Theory for Psychologists*. Mahwah, NJ: Erlbaum.

Course Outline, Topics & Assignments

For assignments, other than reading assignments, see the section below on *Evaluation of Student Performance*.

Readings, Part 1

Jan. 17 - 20   **Introduction to Test Theory**
         Readings: McDonald, Chapters 1 & 5, Appendix A, Expectations Handout
         Proof: p. 66 - 67
         Lab: Meet Your Data
         Readings: IRT from SSI, Chapter 1

Jan. 23 - 27   **Test Items, Item Statistics, and Total Item Scores**
         Readings: McDonald, Chapters 2, 3, and 11 (pp. 231 – 243)
         Proof: pp. 35, 41, 44, 50, 238, 239, 240, 242
         Lab: Conventional Item Analysis, SPSS and ITEMAN

Jan. 30 - Feb. 3 **True Score Theory, the One Factor Model, and Test Homogeneity**
         Readings: McDonald, Chapters 6 and 11 (pp. 243 – 247).
         Lab: SPSS, TESTFACT and item intercorrelations
         Readings: IRT from SSI, Chapter 5 (pp. 410 – 417)

Feb. 6 – 10   **Generalizability Theory**
         Readings: Shavelson, R. J. & Webb, M. Generalizability theory. *Encyclopedia of Social Measurement).*
         Lab: SPSS, TESTFACT and the single factor model

Feb. 13 - 17   **Generalizability Theory (cont.)**
         Readings: McDonald, Chapters 9 & 10
         Lab: SPSS and Variance Components

Feb. 20 - 24   **Differential Item Functioning**
                Readings: McDonald, Chapter 15-16
                Lab: SPSS factor and Generalizability

Feb 27 – Mar.3 **Linking, Scaling, and Equating** (cont.)
                Readings: McDonald, Chapter 17
                Lab: TESTFACT and linking
                Readings: IRT in SSI, Chapter 7 (pp. 532 – 535)

Mar. 6 – 10   **Linking, Scaling, and Equation Continued**
                Readings: McDonald, Chapter 18
                Lab: TESTFACT: Item Factor Model and Item Response Theory
                Readings: IRT from SSI, Chapter 7 (pp. 538 – 544)

Technology
This course will acquaint students with some of the most advanced software in the field.. And it will acquaint students with some of the most advanced applications of more familiar software.

Evaluation of Student Performance

Grades for the course will be based on the following:

1. A paper based on Part 1, although it may include material from Part 2 as well.

2. A graded laboratory assignment in Part 2.

3. A take-home examination. The exam will include two questions from Part 1, two questions from Part 2, and two questions that integrate the material from Parts 1 and 2. The exam must be typed; single-spaced is acceptable.

The paper should be no longer than about 6 single-spaced or 10 double-spaced pages. It can be based on empirical or simulated date, including data used in the labs, or it can be literature reviews.   It could also be a computer program to execute one of the analyses covered in class. You should meet with Dr. Nhouyvanisvong to discuss and decide on your paper topic.

The graded laboratory assignment will be described in lab sessions and in the separate syllabus covering Part 2.

The take-home exam questions for Part 1 will be made available at the end of Part 1. The remaining questions will be made available near the end of Part 2.

Due dates: The paper for Part 1 will be due on March 31. The take-home exam will be due on May 10.

Late paper/exam policy: The instructors have as much time to read a paper as the paper is late. That means that if you submit your paper three months after the course is over, we have three months to read it (see further conditions below). If your paper is two years late, we have the option of taking two years to read it (we *might* not exercise that option, but reserve that right).

Furthermore, we do *not* read papers during the summer break, nor do we read them during sabbatical or other leaves. Therefore, if you will need your grade in this course for a specific purpose (e.g., to take a prelim oral or to graduate) be sure to submit your papers/exam with sufficient time for us to read it under the policies stated above.

Each assignment will be weighted equally in determining the total points. Grades will be assigned as follows based on the percentage of total points earned.

Letter Grade	Percentage
A	92-100%
A-	90-91.9%
B+	88-89.9%
B	83-87.9%
B-	80-82.9%
C+	78-79.9%
C	73-77.9%
C-	70-72.9%
D+	68-69.9%
D	60-67.9%
F	Below 60%

A -- achievement that is outstanding relative to the level necessary to meet course requirements.
B -- achievement that is significantly above the level necessary to meet course requirements.
C -- achievement that meets the course requirements in every respect.
D -- achievement that is worthy of credit even though it fails to meet fully the course requirements.
S -- achievement that is satisfactory, which is equivalent to a C- or better (achievement required for an S is at the discretion of the instructor but may be no lower than a C-).

F (or N) -- Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (see also I)
Academic dishonesty: academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course.
I -- (Incomplete) Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. Requires a written agreement between instructor and student.

For undergraduate courses, one credit is defined as equivalent to an average of three hours of learning effort per week (over a full semester) necessary for an average student to achieve an average grade in the course. For example, a student taking a three credit course

that meets for three hours a week should expect to spend an additional six hours a week on coursework outside the classroom.

How to Access Your Grades
Go to OneStop for Students (http://onestop.umn.edu/onestop/), click on Grades & Transcripts; on the right side under Quick Links, click on Grades/Unofficial transcript.

Make-up policy
See *Late paper/exam* policy above.

Returning Papers, Exams, and Projects
Papers and exams will be returned through campus mail if read in hardcopy form or through email if they are read on screen.

University Policies
See http://onestop.umn.edu/onestop/faculty/Teaching/Policies.html for a list of policies related to teaching with links to those policies. Also see http://www1.umn.edu/usenate/usen/policies.html for University Senate policies related to Teaching/Education.

Statement on accommodations
It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact their instructors to discuss their individual needs for accommodations.

Statement on classroom conduct (http://www1.umn.edu/usenate/policies/classexpectguide.html and/or http://www1.umn.edu/regents/policies/academic/StudentConductCode.pdf)
Add text here.

Statement on academic misconduct
(http://www1.umn.edu/regents/policies/humanresources/Academic_Misconduct.pdf)

Scholastic misconduct is broadly defined as "any act that violates the rights of another student in academic work or that involves misrepresentation of your own work." Scholastic dishonesty includes, (but is not necessarily limited to): cheating on assignments or examinations; plagiarizing, which means misrepresenting as you own work any part of work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of all instructors concerned; depriving another student of necessary course materials; or interfering with another student's work.

Statement regarding sexual harassment
(http://www1.umn.edu/regents/policies/humanresources/SexHarassment.pdf)
Add text here. ("Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature when: (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or academic

advancement in any University activity or program; (2) submission to or rejection of such conduct by an individual is used as the basis of employment or academic decisions affecting this individual in any University activity or program; or (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. University policy prohibits sexual harassment. Complaints about sexual harassment should be reported to the University Office of Equal Opportunity, 419 Morrill Hall.)

Support Services
Go to http://www1.umn.edu/ohr/teachlearn/syllabus/specialserv.html to see some possible support services for your students. Also check within your department for resources.

This publication/material is available in alternative formats upon request. Please contact the instructors.

The University of Minnesota is an equal opportunity employer and educator.