GEORGE MASON UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
EDUCATIONAL PSYCHOLOGY PROGRAM

EDEP 651
Modern Measurement with Application in Education and Behavioral Sciences
Fall 2010
Location: Innovation Hall, Room 333

PROFESSOR

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COURSE DESCRIPTION:

Undergraduate Prerequisites: Junior standing or sophomore honors /university scholar candidate.

Graduate Prerequisites: EDRS 531

Course catalog description: Focus on modern concepts of measurement with computer aided applications in education.

This course is designed for graduate students in educational psychology and related fields who want a background in modern measurement theory and methods used in those fields. The course covers topics from classical test theory, factor models of test items, generalizability theory, and item response theory. Applications include advanced techniques in test construction, the analysis of binary and rating data, test equating, differential item functioning (item fairness), and cognitive diagnosis. Lecture sessions include a combination of lecture and student discussion within the environment of computer software applications and interpretations of results. After completing the course, students should be prepared to begin working on advanced applications of measurement in education and the behavioral sciences.

NATURE OF COURSE DELIVERY:

This course consists of lectures, large group discussion, in class activities including applications of computer software in measurement, and individual/group assignments. In the tradition of constructivist learning, this course focuses on providing rich, interactive experiences in modern measurement and reflecting on those experiences. We will draw on concepts and methods from the readings, lectures, and computer-aided applications to understand methods and computer-aided procedures of modern measurement and interpret measurement data in the educational context.

COURSE OBJECTIVES:

Learner Outcomes - This course is designed to enable students to:

1. Students will be able to understand fundamental concepts, principles, and procedures of modern measurement and test development.
2. Students will be able to display knowledge of modern integrative concepts and methods in measurement and test development.
3. Students will be able to analyze and interpret measurement data in classical and modern frameworks, with computer aided applications in educational context.
4. Students will be able to envision ways to pursue their interests in the area of educational assessment and measurement in their graduate study or careers.
5. Students will synthesize and present the integration of their learning in a formal literature review.

PROFESSIONAL STANDARDS:

The program goals are consistent with the following Learner-Centered Psychological Principles outlined by the American Psychological Association Presidential Task Force in Education (APA, Division 15).

- Principle 1: The Nature of Learning Process
- Principle 2: Goals of the Learning Process
- Principle 3: Construction of Knowledge
- Principle 4: Strategic Thinking
- Principle 5: Thinking about Thinking
- Principle 6: Context of Learning
- Principle 7: Motivational and Emotional Influences on Learning
- Principle 8: Intrinsic Motivation to Learn
- Principle 9: Effects of Motivation on Effort
- Principle 11: Social Influences on Learning
- Principle 13: Learning and Diversity

Reference:
American Psychological Association (1997). Learner-Centered Psychological Principles: Guidelines for the Teaching of Educational Psychology in Teacher Education Programs. Retrieved October 14, 2002 from http://www.apa.org

A. Course Requirements

It is expected that each of you will:

1. Attend each class session
2. Participate in classroom activities, laboratories, and assignments.
3. Read all assigned materials
4. Prepare and submit a project (see details in course assignments and evaluation).

B. Performance-based assessments

Please see assessment rubrics (p. 6-8).

REQUIRED BOOKS/MATERIALS:

Osterlind, S. (2010) ***Modern Measurement: Theory, Principles, and Applications of Mental Appraisal*** **(2nd ed.). Pearson, Upper Saddle River: NJ [**ISBN: 9780137010257**]**

Student Responsibilities:

(1) Read all assigned materials for the course.
(2) Participate in classroom activities that reflect critical reading of materials.
(3) Complete two in class assignments and HW assignments.
(4) Design and conduct a pilot research study
(5) Present the pilot research study in class in a poster format.
(6) Attend each class session.

Course Evaluation

1. In class/Homework Assignments: Students will be asked to work individually on homework assignments throughout the semester.

2. Midterm Examination (Closed books and notes)

3. Pilot Research Study: This course requires students to develop and conduct a pilot-research study in an educational setting. This study is intended to reflect what you have learned from this course. It should be written in a way that one would submit for a national professional conference paper presentation. Other requirements for this course are designed to build up bases for the final pilot research proposal. Research papers must be handed in on time and must adhere to the APA Publication Manual Guidelines.

This pilot research study will be divided into 4 sequential parts.

1. Identify broad topic of interest; conduct a literature review; discuss significance of the proposed study; state purpose and hypotheses.
2. Methods - describe sample, measures to test hypotheses, procedures and data collection, design of the study, data analysis.
3. Write the results section.
4. Discussion and Conclusion.

The presentation of the final paper will take place the last day of class in a research paper format (APA style, see also guidelines posted on the AERA website, www.aera.net.org.) After completing the research study, reflect on that experience. What did you learn from it? How do you think course material helped you carry out the study? [**Scoring rubric** for the research paper on pp. 6-7].

4. Final Examination: Semi-comprehensive (closed books and notes) examination

5. Class Participation and Attendance Policy: Because of the importance of lecture and discussion to your total learning experience, I wish to encourage you to both attend and participate in class regularly. Attendance, punctuality, preparation, and active contribution to small and large group efforts are essential. These elements of your behavior will reflect the professional attitude implied in the course goals and will account for 5% of your course grade. With reference to the grading scale described later in this syllabus, you will note that this percentage is equivalent to a full letter grade. Students who must miss a class must notify the instructor (preferably in advance) and are responsible for completing all assignments and readings for the next class.

RUBRIC FOR PARTICIPATION AND ATTENDANCE

		LEVEL OF PERFORMANCE		
ELEMENT	**Distinguished (4-5 pts.)**	**Proficient (3 pts.)**	**Basic (2 pts.)**	**Unsatisfactory (1 or 0 pts.)**
Attendance & Participation	The student attends all classes, is on time, is prepared and follows outlined procedures in case of absence, the student actively participates and supports the members of the learning group and the members of the class.	The student attends all classes, is on time, is prepared and follows outlined procedures in case of absence; the student makes active contributions to the learning group and class.	The student is on time, prepared for class, and participates in group and class discussions. The student attends all classes and if an absence occurs, the procedure outlined in this section of the syllabus is followed.	The student is late for class. Absences are not documented by following the procedures outlined in this section of the syllabus. The student is not prepared for class and does not actively participate in discussions.

<u>Grading Policy</u>

Class Participation and Attendance	5 pts.
Individual Homework Assignments	10 pts.
Pilot Research Study	30 pts
Midterm Examination	25 pts.
FINAL EXAMINATION	30 pts.
TOTAL	**100 pts**

Letter grades will be assigned as follows:

A+	98-100%	A	93-97.49%	A-	90-92.49%
B+	88-89.49%	B	83-87.49%	B-	80-82.49%
C	70-79.49%	F	below 70%		

Honor Code

All evaluations and homework will be taken under the GMU Honor Code. Students are expected to abide by the honor code set forth in the current edition of the Student Handbook. All exams, assignments and papers are honor work. That means that students must not give nor receive any unauthorized assistance. While members of a team may collaborate on written paper assignments, they may not give or receive assistance from other teams. Plagiarism is also a violation of the honor code. The University's Honor Code guidelines for academic honesty are at: http://mason.gmu.edu/~montecin/plagiarism.htm

Learning Disabilities

Students with any type of documented disability that may interfere with their learning in this class may negotiate a reasonable accommodation with the instructor. If you have not contacted the Office of Disability Services, and you have a disability please make sure to register for services.

CEHD STATEMENT OF EXPECTATIONS

The College of Education and Human Development (CEHD) expects that all students abide by the following:

● Students are expected to exhibit professional behavior and dispositions. See http://www.*CEHD.gmu.edu* for a listing of these dispositions.

● Candidates are expected to abide by the George Mason University Honor code. Violations (cheating, attempted cheating, plagiarizing, lying, stealing) will be reported to the Honor Committee. Students must follow the guidelines of the University Honor Code. See http://www.gmu.edu/catalog/apolicies/#TOCH12 for the full honor code.

● Students must agree to abide by the university policy for Responsible Use of Computing. See http://mail.gmu.edu and click on Responsible Use of Computing at the bottom of the screen. This syllabus is subject to change based on the needs of the class. The Americans with Disabilities Act (ADA) prohibits discrimination against individuals with disabilities in the series, programs, or activities of all state and local governments. Under ADA a disability is defined as a physical or mental impairment that substantially limits a major life activity such as learning, working, walking, speaking, hearing, breathing and/or taking care of oneself. If a student has a disability and needs course adaptations or accommodations because of that disability, it must be established with the faculty, in writing, at the beginning of the semester so arrangements can be made.

● Students with disabilities who seek accommodations in a course must be registered with the GMU Disability Resource Center (DRC) and inform the instructor, in writing, at the beginning of the semester. See www.gmu.edu/student/drc or call 703-993-2474 to access DRC.

Reading from text

Session	Topic	Text Chapter[1]
Aug. 31	Review of relevant statistical concepts and procedures	**1, 2**
Sept. 7	Classical Test Theory (CTT): True-score model	**3,** IMBB
Sept. 14	Reliability and Validity of Measurements	**4, 5,** IMBB
Sept. 21	Common factor model of true scores and reliability	IMBB
Sept. 28	Scales and Norms	**6, 7**
Oct. 5	Generalizability Theory Approach to Reliability	**11,** IMBB
Oct. 12	**Columbus Day recess (No Classes)**	
Oct. 19	**Midterm Examination**	
Oct. 26	Item Response Theory (IRT): Description and relation to CTT. One-parameter IRT model of measurement	**10,** IMBB
Nov. 2	Two- , and Three-Parameter Models in IRT	**10,** IBMM
Nov. 9	Rasch model of measurement	**10,** IMBB
Nov. 16	Differential item functioning (DIF)	IMBB
Nov. 23	Scale Equating in IRT	**15,** IMBB
Nov. 30	Cognitive diagnosis: Introduction and selected models [Linear Logistic Test Model, DINA, and Least Squares Distance Model]	IMBB
Dec. 7	Review and Project Discussion [Projects due]	
Dec. 14	**Final Examination**	

Note. **IMBB =** Instructor's Materials on the Black Board Learning System

[1] Osterlind, S. (2010) *Modern Measurement: Theory, Principles, and Applications of Mental Appraisal* (2nd ed.). Pearson, Upper Saddle River: NJ [ISBN: 9780137010257]

Name: _____ **Date:**_____

Semester: _____ **Grade:** _____ **pts.**

EDEP 651

Modern Measurement with Applications in Education

RUBRIC FOR RESEARCH PAPER

GENERAL EVALUATION CRITERIA:

- *Clarity and organization*
- *Comprehensiveness of content*
- *APA style*

TOTAL SCORE: **MAX = 30 pts.**

PERFORMANCE ELEMENTS	QUALITY POINTS				
	1	**2**	**3**	**4**	**5**
Cover page clearly organized with title, name, date, and boiler plate (partial fulfillment, Instructor's name, and school					
Introduction Section					
a. Statement of the nature of the problem and its importance (include also a description of some recent studies related to the issues)					
b. Justification of the need for this study					
c. Statement of specific research questions.					
	max = 6 pts.				
Methods Section					
a. **Sample:** description of the **sample (**size, subgroups, demographic characteristics)					
b. **Data:** description of the data (instruments, scales, reliability of scores)					
c. **Data collection:** description of the data collection method (e.g., using existing records on student)					
d. **Statistical Data Analysis**: Description of the statistical methods and procedures used to address the research questions in the project					

	max = 8 pts.
Results Section [Presentation of results obtained with the statistical data analysis for each research question] **Relevance, accuracy, completeness, and APA style of the results provided** a. within text of the results section, b. tables (each on a separate page) after references c. figures (each on a separate page) after tables	**QUALITY POINTS** **1 2 3 4 5** **max = 8 pts**.
5. Discussion/Conclusions Section a. Conclusions drawn from the results [findings and implications for theory and/or practice] b. Statement of limitations c. Recommendations for future research .	
	max = 8 pts.