

# EDRS 811-002 Quantitative Methods in Educational Research

George Mason University, Graduate School of Education

**Dr. Dimiter Dimitrov**

Fall 2012

**Class Meeting:** Wednesday, 4:30pm-7:10pm, IN 326

**Office:** West Building, Room 2007

**Phone:** (703) 993-842

**Office Hours:** Wednesday & Thursday (2:30pm – 4:00 pm)

**E-mail:** ddimitro@gmu.edu

Other hours may be arranged by appointment.

## Course Description

The main purpose of this course is to develop in the students an understanding of statistical ideas and procedures required for conducting correct statistical analysis and applications of quantitative methods in the practice of educational research. The course will reinforce and build upon concepts and skills acquired in EDRS 620. Students will learn through a combination of text reading assignments, hands-on experience in using a computer program for data analysis, and application activities. Students will be expected to identify and report on quantitative methods used in published research (articles), to collect and analyze data using the Statistical Package for Social Sciences (SPSS), and to provide written reports of methodology and results.

*Prerequisites:* Successful completion of EDRS 620 (or its equivalent) or permission of instructor.

**Course Methodology:** This course consists of lectures, large group discussion, in class activities, and individual/group assignments.

## Required Texts:

Dimitrov, D.M. (2008). **Quantitative Research in Education: *Intermediate & Advanced Methods***. NY: Whittier Publications. ISBN: 978-1-57604-301-1

## **COURSE REQUIREMENTS, PERFORMANCE-BASED ASSESSMENT, AND EVALUATION CRITERIA:**

### **A. Requirements**

- 1. In class/Homework Assignments (10%):** Students will be asked to work individually on homework assignments throughout the semester.

2. **Class Attendance and Participation (5%):** Students are required to attend all classes, to be on time, prepared, follow outlined procedures in case of absence, actively participate and support the members of the learning group and the members of the class. The scoring rubric for class attendance and participation is provided in Appendix 1.
3. **Midterm Examination (15%):** Students will take a midterm examination (closed books and notes) to demonstrate understanding and knowledge of course content covered to date of examination.
4. **Pilot Research Study (50%):** This course requires students to develop and conduct a pilot-research study related to using structural equation modeling and interpretation of results in the context of education research. 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.
5. **Final Examination (20%):** Students will take a final examination (closed books and notes) to demonstrate understanding and knowledge of course content covered throughout the coursework.

**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; identify measures to test hypotheses; discuss procedures and design of the study.
3. Data collection.
4. Data analysis.
5. Write the results section.
6. 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](http://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 is provided in Appendix 2].

**B. Performance-based assessments**

All of the student products specified under course requirements will require performance-based assessments guided by grading rubrics. The scoring rubrics associated with the

assessment of (a) class attendance and participation and (b) pilot research project at proposal development assignment is provided in Appendices 1 and 2, respectively.

### C. Criteria for evaluation

There are 100 total points for the course, distributed among the homework assignments (10%), class attendance and participation (5%), midterm examination (25%), pilot research project (30%), and final examination (30%).

### D. Grading scale

Letter grades will be assigned as follows:

<b>A+</b>	97.5 - 100%,	<b>A</b>	92.5 - 97.49%,	<b>A-</b>	89.5 - 92.49%,
<b>B+</b>	87.5 - 89.49%,	<b>B</b>	82.5 - 87.49%,	<b>B-</b>	79.5 - 82.49%,
<b>C</b>	70-79.49%, and				
<b>F</b>	below 70%				

## COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

### *Student Expectations*

- Students must adhere to the guidelines of the George Mason University Honor Code [See <http://academicintegrity.gmu.edu/honorcode/>].
- Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See <http://ods.gmu.edu/>].
- Students must follow the university policy for Responsible Use of Computing [See <http://universitypolicy.gmu.edu/1301gen.html>].
- Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
- Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.
- Students are expected to exhibit professional behaviors and dispositions at all times.

### *Campus Resources*

- The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling,

workshops and outreach programs) to enhance students' personal experience and academic performance [See <http://caps.gmu.edu/>].

- The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing [See <http://writingcenter.gmu.edu/>].
- For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website [See <http://gse.gmu.edu/>].

ELEMENT	LEVEL OF PERFORMANCE			
	Distinguished (4-5 pts.)	Proficient (3 pts.)	Basic (2 pts.)	Unsatisfactory (1 or 0 pts.)
<b>Attendance &amp; Participation</b>	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.

### Grading Policy

Class Participation and Attendance	5 pts.
Individual Homework Assignments	10 pts.
Pilot Research Study	50 pts
Midterm Examination	15 pts.
FINAL EXAMINATION	20 pts.
<b>TOTAL</b>	<b>100 pts</b>

**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>

**Academic Integrity**

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

**Office of Disability Services**

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. <http://ods.gmu.edu>.

**Other Useful Campus Resources:**

WRITING CENTER: A114 Robinson Hall; (703) 993-1200; <http://writingcenter.gmu.edu>  
 UNIVERSITY LIBRARIES "Ask a Librarian" <http://library.gmu.edu/mudge/IM/IMRef.html>  
 COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): (703) 993-2380;  
<http://caps.gmu.edu>.

**University Policies**

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university affairs.

## **GMU E-mail Accounts**

Students must activate their GMU email accounts to receive important University information, including messages related to this class.

### *Student Expectations*

- Students must adhere to the guidelines of the George Mason University Honor Code [See <http://academicintegrity.gmu.edu/honorcode/>].
- Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See <http://ods.gmu.edu/>].
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- Students are expected to exhibit professional behaviors and dispositions at all times.

### *Campus Resources*

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- For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website [See <http://gse.gmu.edu/>].

	<b>Reading from text</b>	<b>Chapter<sup>a</sup></b>
<b>Aug. 29</b>	Concepts of measurement in education	1, 2, 3
<b>Sept. 5</b>	Research Design	4, 5
<b>Sept. 12</b>	Review of introductory statistics – part 1	6, 7
<b>Sept. 19</b>	Review of introductory statistics – part 2	8, 9
<b>Sept. 26</b>	Correlation and Regression	10, 11
<b>Oct. 3</b>	Nonparametric tests [chi-square tests]	12
<b>Oct. 10</b>	Multiple regression	13
<b>Oct. 17</b>	Multiple regression (continuation)	13
<b>Oct. 24</b>	<b>Midterm Examination</b>	
<b>Oct. 31</b>	One-factor Analysis of Variance (ANOVA)	14
<b>Nov. 7</b>	Two- and Three-factor ANOVA	15
<b>Nov. 14</b>	Analysis of covariance (ANCOVA)	16
<b>Nov. 21</b>	Thanksgiving recess (no classes)	
<b>Nov. 28</b>	Multiple regression for ANOVA purposes	17
<b>Dec. 5</b>	ANOVA with random factors	18
<b>Dec. 12</b>	<b>FINAL EXAMINATION</b>	

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<sup>a</sup> **Website for the book:** <http://cehd.gmu.edu/book/dimitrov> [includes SPSS data files used in examples in the book and answers to study questions by chapters.]

## APPENDIX 1

### RUBRIC FOR PARTICIPATION AND ATTENDANCE

	<b>LEVEL OF PERFORMANCE</b>			
<b>ELEMENT</b>	<b>Distinguished (4-5 pts.)</b>	<b>Proficient (3 pts.)</b>	<b>Basic (2 pts.)</b>	<b>Unsatisfactory (1 or 0 pts.)</b>
<b>Attendance &amp; Participation</b>	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, 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.



## APPENDIX 2

### RUBRIC FOR RESEARCH PAPER

#### GENERAL EVALUATION CRITERIA:

- Clarity and organization
- Comprehensiveness of content
- APA style

TOTAL SCORE: **MAX = 50 pts.**

Performance Elements	Quality Points
<b>Introduction Section</b>	<b>max = 9 points</b>
Statement of the nature and importance of the problem and literature review related to the issues.	<b>4-5 points:</b> The study problem is (a) relevant to the area of educational research, (b) described in a parsimonious and complete manner, (c) channeled towards the purpose of the study, and (d) embedded in a literature review on related theory and research.
	<b>2-3 points:</b> The study problem is relevant to the area of educational research and overall well described, but not channeled towards the purpose of the study or the literature review is not quite on target.
	<b>0-1 points:</b> The study problem is not relevant to the area of educational research and/or not clearly described, poorly channeled towards the purpose of the study, and not supported well by literature review.
Justification of the need for this study	<b>2 points:</b> The justification of the study is well described and stems from a necessity to fill up an existing gap in previous research on the topic or to conduct a replication study.
	<b>0-1 points:</b> The justification of the study is not well described and/or does not stem from a necessity to fill up an existing gap in previous research on the topic or to conduct a replication study.
Statement of the purpose of the study and related research questions.	<b>2 points:</b> The purpose of the study is connected to the statement of the problem and the research questions are properly described.
	<b>0-1 points:</b> The purpose of the study is not well connected to the statement of the problem and/or the research questions are not properly described.

<b>Method Section</b>		<b>max = 13 points</b>
Description of the study sample	<b>4 points:</b> Provided is clear, accurate, and complete description of the study sample — sampling method (random selection, volunteers, etc.), relevant demographic characteristics, sample size (total and by subgroups), and judgment about sample representativeness for the targeted population.	
	<b>2-3 points:</b> Provided is relatively complete description of the study sample, with drawbacks related to the description of sampling method, relevant demographic characteristics, sample size, or sample representativeness.	
	<b>0-1 points:</b> Provided is poor description of the study sample, with missing elements related to method of sampling, relevant demographic characteristics, and representativeness.	
Description of the data (instruments, scales, and score reliability)	<b>2-3 points:</b> Provided is clear, accurate, and complete description of the data sources (e.g., assessment instruments, existing records, etc.), scoring rubrics, scales, and reliability of scores obtained for the study sample.	
	<b>0-1 points:</b> Provided is incomplete (or lacking) description of data sources and there is no report on reliability estimates.	
Description of the data collection method	<b>2 points:</b> Provided is clear, accurate, and complete description of the data collection method — e.g., existing students records or online data base.	
	<b>0-1 points:</b> Provided is incomplete (or lacking) description of the data collection method.	
Description of data analysis methods and procedures used to address the research questions in the project	<b>4 points:</b> Provided is clear, accurate, and complete description of <i>appropriate</i> data analysis methods and procedures used to address the research questions.	
	<b>2-3 points:</b> Selected are <i>appropriate</i> methods and procedures of data analysis, with lack of sufficient clarity, accuracy, and/or completeness in description.	
	<b>0-1 points:</b> Some (or all) of the selected data methods and procedures are <i>not appropriate</i> for addressing the project research questions.	
<b>Results Section</b>		<b>max = 14 points</b>
	<b>8 points:</b> Provided is clear, accurate, and complete presentation of relevant results in APA style by	

Within-text presentation of results obtained with the statistical data analysis for each research question	project research questions.
	<b>6-7 points:</b> Provided is clear, accurate, and complete presentation of relevant results by project research questions, with some deviations from the APA style.
	<b>5-6 points:</b> Presented are relevant results by project research questions, with some deviations from clarity, completeness, and the APA style.
	<b>4-5 points:</b> Presented are relevant results by project research questions, with some deviations from clarity, accuracy, completeness, and the APA style.
	<b>2-3 points:</b> Some results are irrelevant and/or there are problems with clarity, accuracy, completeness, and APA style.
	<b>0-1 points:</b> Some (or all) results are irrelevant and there are serious problems with clarity, accuracy, completeness, and APA style.
Presentation of tables	<b>2-3 points:</b> The tables include all necessary information presented in APA style.
	<b>0-1 points:</b> The tables do not include all necessary information and /or there APA style problems.
Presentation of figures	<b>2-3 points:</b> The figures are clear and provide relevant information in APA style.
	<b>0-1 points:</b> There are some (or serious) problems with clarity of the figures, their relevance, and/or APA style.
<b>Discussion Section</b> <span style="float: right;"><b>max = 14 points</b></span>	
Conclusions drawn from the results, findings and implications for theory and/or practice	<b>8 points:</b> Provided is clear, accurate, and complete presentation of conclusions drawn from the study results, comparisons with findings in previous studies on the topic of interest, plausible explanations of the study findings, and implications for theory and/or practice.
	<b>6-7 points:</b> Provided is clear, accurate, and complete presentation of conclusions drawn from the study results, with minor problems in accuracy and/or sufficiency related to comparisons with findings in previous studies, plausible explanations of the study findings, implications for theory and/or practice, and APA style.
	<b>5-6 points:</b> The conclusions are drawn from the study results, but there are relatively serious problems in accuracy and/or sufficiency related to comparisons

	with findings in previous studies, plausible explanations of the study findings, implications for theory and/or practice, and APA style.
	<b>4-5 points:</b> Some conclusions are not well connected to the study results and there are relatively serious problems in accuracy and/or sufficiency related to comparisons with findings in previous studies, plausible explanations of the study findings, implications for theory and/or practice, and APA style.
	<b>2-3 points:</b> Some conclusions do not stem from the study results and there are serious problems in accuracy and/or sufficiency related to comparisons with findings in previous studies, plausible explanations of the study findings, implications for theory and/or practice, and APA style.
	<b>0-1 points:</b> The conclusions do not stem from the study results and there are serious problems in accuracy and/or sufficiency related to comparisons with findings in previous studies, plausible explanations of the study findings, implications for theory and/or practice, and APA style.
Limitations of the study	<b>2-3 points:</b> Provides is clear, accurate, and complete presentation of the limitations of the study, with implications for the study findings and their generalization.
	<b>0-1 points:</b> There are serious problems in clarity, accuracy, and completeness of the study limitations and their implications for the findings and their generalization.
Recommendations for future research	<b>2-3 points:</b> The recommendations for future research are clearly presented and stem from logical necessity for meaningful replications (e.g., to validate and/or generalize the findings) and/or further extensions of the study design and analyses.
	<b>0-1 points:</b> The recommendations for future research are <i>not</i> clearly presented and do not address the necessity for replications and/or further extensions.