

COURSE SYLLABUS

EDRS 620 Quantitative Inquiry in Education (3:3:0) EDRS 620 001

Summer 2011

Instructor:	Charles L. Thomas, PhD
Class Day & Time:	Mon & Wed; 4:30 – 7:10 PM
Location:	Innovation Hall 333
Office:	2006 West Bldg
Phone:	703-993-3137
Email:	cthomas@gmu.edu
Office Hours:	Mon & Wed 3:00-4:00 PM Other Times arranged by appointment

Catalog Course Description

This course examines fundamental concepts and methods of statistics as applied to educational problems including descriptive and inferential statistics. The course explores hypothesis testing, correlational techniques, t-tests, analysis of variance, post-hoc comparison, factorial designs, regression, and non-parametric statistics.

Specific Course Description

EDRS 620 is a graduate quantitative analysis course that facilitates student understanding of the basic concepts, and principles of descriptive and inferential statistics. It emphasizes comprehension, skill development and application of statistical knowledge to quantitative inquiry in education. Students learn through a combination of text reading assignments, data analysis and interpretation of SPSS output reports (Statistical Package for Social Sciences), and application activities. Students identify and report on quantitative methods used in published research (e.g., professional journal articles). The course lays the foundation for advanced study of quantitative analysis for students desiring to continue their studies in this endeavor.

Prerequisite: EDRS 590 or equivalent experience

STUDENT OUTCOMES

- Students will be able to design the basic components of a small-scale quantitative research study including descriptive statistics and inferential statistics
- Students will be able to write clearly and coherently about the conceptual framework, questions and methods used in a research study
- Students will be able to deal appropriately with ethical issues in research
- Students will be able to develop research hypotheses that relate to research questions
- Students will be able to demonstrate an understanding of quantitative research design through completion of a project
- Students will be able to identify threats to internal and external validity in simulated studies and their own research design
- Students will be able to conduct statistical analysis using SPSS, and interpret SPSS outputs.

- Students will be able to demonstrate an understanding of t-tests, one-way and two-way ANOVA, regression and non-parametric tests
- Students will be able to demonstrate an understanding of power effect size analysis
- Students will be able to evaluate and critique published quantitative research articles
- Students will be able to develop and reinforce their critical thinking, problem solving, oral and writing skills

RELATIONSHIP TO PROGRAM GOALS AND PROFESSIONAL ORGANIZATIONS

The program goals are consistent with areas of expertise associated with the following Learner-centered psychological principles (APA Division 15) outlined by the American Psychological Association Presidential Task Force in Education.

- 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 13: Learning and Diversity

Please see:

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>

NATURE OF COURSE DELIVERY

The course is structured around readings, reflections on those readings, class projects, technology activities, and exams. This course will be taught using lectures, discussions, and relevant group activities. Learning will be reinforced through the use of hand-on statistical analysis activities, using SPSS, after lectures, discussions and demonstrations. Instruction will be supported by web-based technologies (e.g. WebCT or Blackboard).

REQUIRED TEXT

Dimitrov, D.M. (2008). **Quantitative research in education: *Intermediate & advanced methods***. NY: Whittier Publications. ISBN: 978-1-7604-285-4

RELATED RESOURCES

American Psychological Association. (2009). *Publication manual of the American Psychological Association*. 6th Ed. Washington, D. C.: American Psychological Association.

Thomas, C. L. (2010). *Blackboard Learning Resources*.

COURSE REQUIREMENTS

1. **Data Lab Analysis Assignments:** Students will save their individual lab assignments even though they may work in groups. The lab reports will serve as the basis for continued whole class discussion, allowing for revisions as required. Completed assignments should be stored in the electronic portfolio (see below).
2. **Examinations:** Students will complete two (2) performance-based exams that emphasize comprehension and application of the basic statistical concepts studied up to mid-semester and at the end of the semester.
3. **Research Paper:** students must complete a research proposal for a study in an educational setting. The final project must be handed in on time and adhere to the APA Publications Manual Guidelines. *The project should be included in the e-portfolio. Guidelines to be distributed separately.*
4. **E-Portfolio:** This is the storage medium for your required work. It also conveys your reflections of your learning across the various exhibits that are stored as evidence of your work.
5. **Class Participation and Attendance** are essential. These elements of behavior will reflect the professional attitude implied in the course goals and *will account for 5% of the course grade*. Class participation is assessed by student involvement and completion of in- class data analysis activities (see Appendix C, rubric for e-portfolio). These activities are essential reinforcements to the learning of course content provided through readings, lectures and class discussion. If it is necessary to miss a class, you must notify the instructor (preferably in advance) and are responsible for completing all assignments and readings for the next class.

Grading Policy & Relative Weights

Grading is performance-based and guided by a combination of grading rubrics for written projects and grades on specific assignments and the midterm test. Table 1 summarizes the relative weights, in terms of absolute quality point. Rubrics associated with class participation, the data analysis project, and the electronic portfolio are found in the appendices. Letter grades are derived from individual student deliverables based on the percentage equivalents summarized in Table 2.

Table 1. Relative Weights of Student Products (% of Final Grade)

Class Participation and Attendance (See e-portfolio rubric)	5 %
Midterm Examination	20 %.
Final Examination	30%
Research Proposal	30 %
Electronic Portfolio	15 %
TOTAL	100 %

Table 2. Letter Grade Equivalents

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%		

Note:

- All written assignments must be typed and must follow APA format
- Grading on written work will take into account the following factors: quality of written work, knowledge of content area, and adherence to requirements of assignment. all work will be turned in on the assigned dates. A late assignment is subject to a penalty of 10% of the award for every day that it is overdue

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/>].

GSE faculty may add at the conclusion:

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

RHT faculty may add at the conclusion:

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

APPENDIX A
Schedule of Reading Assignments

Date	Reading from text	Chapter
June 6	Class Orientations & Introduction to the Discipline <i>Concepts of measurement in social science research</i> <i>Introduction to the SPSS Environment</i>	1
June 8	Review of Introductory Statistics: Organizing & Interpretation of Graphic Data	6
June 13	Review of Introductory Descriptive Statistics	6
June 15	Basic Distributions (normal, <i>t</i> -, <i>F</i> - and <i>chi-square</i> distributions	7
June 20	Hypothesis testing for the Mean	8
June 22	Hypothesis testing for the Mean (con't)	8
June 27	Hypothesis testing for Proportions	9
July 4 INDEPENDENCE DAY	
July 6	MIDTERM PERFORMANCE -BASED EXAMINATION	1, 6, 7 - 9
July 11	Correlation and Simple Regression	10
July 13	Nonparametric Tests <i>Review Discussion of Data Analysis Project</i>	12
July 18	Multiple Regression	13
July 20	Multiple Regression	13
July 25	One-factor Analysis of Variance (ANOVA)	14
July 27	Final Exam & Submission of e-Portfolio with Research Paper	10,12-14

APPENDIX B

EDRS 620

QUANTITATIVE METHODS IN EDUCATION RESEARCH

Name: _____

Date: _____

Semester: _____

Grade: _____ pts.

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 problem, its importance, and <i>some previous studies</i> related to the problem. b. Justification of the need for this study c. Statement of research questions.					
	max = 6 pts.				
Methods Section a. Sample: description of the sample b. Data: description of the data c. Data collection: description of the data collection method d. Statistical Data Analysis: Description of the statistical methods used to address the research questions in the project					
	max = 8 pts.				
Results Section [Presentation of results obtained]	QUALITY POINTS				

with the statistical data analysis for each research question] Relevance, accuracy, completeness, and APA style of the results	1	2	3	4	5	
	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					
max = 8 pts.						
1. Discussion/Conclusions Section						
a. Conclusions drawn from the results						
b. Statement of limitations						
c. Recommendations for future research						
max = 8 pts.						

APPENDIX C

RUBRIC FOR ELECTRONIC PORTFOLIO

Maximum Total Points = 15					
PERFORMANCE ELEMENTS	QUALITY POINTS				
<u>Organization & Participation</u>	1	2	3	4	5
<ul style="list-style-type: none"> • Each Section (e.g., in class lab assignments, and research paper) is <i>introduced by a brief description and reflection of learning value of activities</i> 					
<ul style="list-style-type: none"> • Writing is clear, concise, and free of grammatical errors 					
<ul style="list-style-type: none"> • In class participation as assessed by completion of classroom data lab analysis assignments 					
	max = 15 pts.				