

## **EDRS 620 002: Quantitative Methods in Educational Research Spring 2016, 3 credits**

**Course Time: Tuesday 7:20-10:00 p.m.**

**Course Location: L014 Thompson Hall**

**Instructor: Erin M. Ramirez, M. Ed.**

Office Hours: Tuesday 5:30-7:00 p.m. and by appointment

Office Hours Location: Room 2103 West Building

Email Address: [eramire4@gmu.edu](mailto:eramire4@gmu.edu)



### **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 printouts (Statistical Package for Social Sciences), and application activities. 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**

### **Required Materials:**

1. Gravetter, F. J. and Wallnau, L. B. (2014/2011). Essentials of Statistics for the Behavioral Sciences (8<sup>th</sup> ed.). Belmont, CA: Wadsworth/Thomson Learning. ISBN:978-1-133-95657-0
2. Access to SPSS software. There are computer labs on campus that provide access to SPSS. You can access SPSS software through GMU's virtual computer library at [www.vcl.gmu.edu](http://www.vcl.gmu.edu). Information about how to use the virtual computer library is available at [http://itservices.gmu.edu/services/view-service.cfm?customel\\_dataPageID\\_4609=5689](http://itservices.gmu.edu/services/view-service.cfm?customel_dataPageID_4609=5689).
3. It is the student's responsibility to ensure access to SPSS outside of class time as there will not be sufficient time in class to complete required assignments.
4. A simple nonprogrammable calculator that has a square root function.

### **Related Resource:**

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

**Class Attendance & Participation:** The class sessions will include lecture, small group discussion, and discussion of SPSS outputs in a computer classroom. Each class session will include: lecture with accompanying PowerPoint slides (available on Blackboard before class begins), a short break, and lab work. The lab portion of the class will provide time for hands-on computer work that is directly related to the homework and course goals. *Questions are encouraged.*

The course is technology-enhanced using Blackboard (<http://courses.gmu.edu>). Students are expected to have a MESA account (go to <http://password.gmu.edu> to set an account) and are responsible for any information posted on the course Blackboard site. For assistance with Blackboard students may email [courses@gmu.edu](mailto:courses@gmu.edu), call (803) 993-3141, or go to Johnson Center Rm 311 (office hours: 8:30 am-5 pm). For general technical assistance, students may call (703) 993-8870 or go to the counter in Innovation Hall.

### **Course Expectations:**

It is expected that students will:

1. Read all assigned materials before coming to class;
2. Participate in classroom activities that reflect critical reading of materials;
3. Complete in-class assignments, homework assignments, and quizzes;
4. Complete an in class midterm and final examination;
5. Attend each class session.

### **Course goals:**

By the end of the semester, it is expected that you will be able to:

1. Understand basic concepts, terminology, and assumptions pertinent to statistical analyses;
2. Identify the type of statistic appropriate for a given research question;
3. Use basic inferential statistics to test hypotheses;
4. Interpret statistical findings;
5. Compute, by hand and computer, basic statistical analyses;
6. Design the basic components of a small-scale quantitative research study;
7. Write clearly and coherently about the conceptual framework, research questions and methods used in a study;
8. Report statistical results in correct APA format.

### **Statistics Study Tips:**

1. Read widely; then read some more.
2. 'Google' difficult concepts. There is lots of helpful statistical information on the web.
3. Check for understanding frequently. This means that when a formula is presented; take time to see if you can explain how the formula works. If Greek letters are difficult for you, write out what each letter means.
4. Complete as many questions/problems as possible at the end of the chapters.
5. Develop examples of research questions and hypotheses that are appropriate for each statistical technique.
6. Form a study group.
7. Start the homework as soon as possible after class; waiting until the night before it is due does not help you process the material.

## My Teaching Philosophy

I view teaching through a guided constructivist approach and therefore you must be present in order to gain knowledge and continue to engage in learning. As master's/doctoral students, my main goal for you is to help you become *expert learners*. It is not realistic for me to be your only source of information, nor is it a viable learning model. Make use of the many resources that are easily available on the web and work with one another. The most important thing you can bring with you to class is a willingness to try to conceptually understand the material. *Please be active--ask questions and participate*. Further, I believe in process over product especially when learning new and challenging material; therefore, all homework and article critiques may be revised *once* after the initial submission of the assignment. This offers you the chance to work through the conceptual understanding of different statistical analyses presented in this course before demonstrating this knowledge on the midterm and final exam.

### Four Principles for Constructive Engagement in This Course

#### 1. COMMITMENT IS KEY

This course involves difficult reading. Many students find that for success in statistics they need to read the information more than once. Give yourself the time to read through the material in an effective way in order to make meaning of the information. The assignments and readings build off each other week-by-week. Be committed and engaged to the discussions, readings, and assignments to allow yourself to be challenged. Also, being committed means that no texting, email, social media, and/or phone calls during class.

#### 2. ACTIVE AND COLLABORATIVE LEARNING

Being thoughtful, respectful and engaged during this class is pivotal for the ultimate learning experience. Much of what we accomplish in this class is through lecture, small group discussions, and lab work. Students are expected to have skimmed all class readings prior to each session in order to engage in active listening, dialogue, and working together on lab assignments. After each session, students are expected to have completed the assigned readings on the specific course topics. Many students find course topics most easily understood by: skimming readings prior to class, actively engaging in lecture/lab, and then re-reading assigned readings after class. Learn from each other, work together, and don't be afraid to ask questions.

#### 3. FOLLOW DIRECTIONS AND BE PROACTIVE

In my past four years of teaching at Mason, most students lose points on their assignments for not reading the assignment instructions and/or not giving themselves enough time to complete the assignment in its entirety. Read directions thoroughly and begin assignments sooner rather than later. Statistics work takes longer than most other coursework due to the difficulty and relative newness of the information presented. Give yourself time to work through assignments. If you don't know something, please do not assume; ask questions and be proactive.

#### 4. BE PROUD OF YOUR WORK

Each assignment builds upon the last. Extensions, therefore, should only be requested when absolutely necessary and as soon as possible. Additionally, I cannot read minds, so if you have any questions or concerns throughout the semester, please write me an email/schedule an appointment. I am willing and flexible enough to make adjustments as needed. I want to make sure that you have a meaningful course experience. Again, this is when being proactive will pay off.

**Late Assignments:** *As a general rule, late papers/homework will not be accepted.* If you believe you have EXCEPTIONAL circumstances and wish to negotiate to have extra time to complete course work, you must discuss this with me before the day the assignment is due. (Negotiating means that you will be sacrificing a portion, perhaps substantial, of your grade for extra time).

### **Course Evaluations:**

- **Online Quizzes (10%):** Each week there will be a short quiz posted on Blackboard. The quizzes are composed of short answer and multiple choice items which will cover the basic concepts presented in class and in the textbook. Quizzes are timed (usually 25 minutes) and must be completed during the specified time period. These quizzes are designed to provide you (and me) with feedback about your course progress. Your quiz score **cannot** lower your overall course grade (unless you have received 0's on quizzes due to failure to complete them). You must complete the online quiz by midnight the day before class meets. ***You are encouraged to take the quizzes soon after the class meeting; the purpose of the quiz is to help you to isolate key concepts from the class period and to focus your study time.*** Final grades are calculated both with and without the online quiz grades, with the higher final grade entered into patriotweb; therefore, the quizzes **cannot** lower your grade in any way unless you fail to complete them.
- **Homework Assignments (20%):** You will have 4 homework assignments. Assignments will be posted weekly on Blackboard with their corresponding rubrics. Each week's assignment will include problems that are recommended as well as problems that will be graded. The graded problems will be collected periodically (see tentative schedule). All assignments will be posted on Blackboard. Each assignment should be completed on the computer, printed out, and handed in at the beginning of the class on the date. These assignments are meant to apply and practice the course material. Questions will ask students to explain statistical concepts, work out problems, and or run analyses using SPSS and interpret results. Students should show all of the work for any problem completed and include appropriate computer printouts (**please cut and paste from SPSS to Word**). You may work together on your assignments; however, students should submit their own independent write-up of results.
- **Exams (25% each; 50% total) \*\*:** The two exams will cover the material from the class and textbook and include multiple choice and short answer questions as well as interpretation of SPSS output. There will be an in-class review (weather permitting) before each of the exams. The midterm exam is worth 25% and the final exam is worth 25%.
- **Article Summaries (10% each—20% total)**  
Students will complete two article summaries with a particular emphasis on the research questions, methods, analysis, and results. For the first article summary, students will respond to a series of questions using an article that has been selected by the instructor. For the second article summary, each student may select from options provided by the instructor or identify an empirical journal in the student's area of interest that includes both ANOVA and correlation. Students will read the entire article, identify key components of the methods/analysis and write a short commentary/critique (2 pages maximum) of the Methods & Analysis section. Rubrics are available on blackboard. Helpful hint: *Pay attention to the methods and analyses sections of articles from other courses or research projects. These are great candidates for this course requirement.*

## Grading Scale:

Grades will be assigned based on the following:

A+	98-100%	B+	88-89%	C	70-79%
A	93-100%	B	83-87%	F	below 70%
A-	90-92%	B-	80-82%		

Final grades are based in the assessments described above. “Extra credit” is not available.

\*\*Performance-Based Assessment that must be submitted via TK20 on Blackboard.

## GMU Policies and Resources for Students

a. Students must adhere to the guidelines of the George Mason University Honor Code (See <http://oai.gmu.edu/the-mason-honor-code/>).

Please note that:

- a. “Plagiarism encompasses the following:
  1. Presenting as one's own the words, the work, or the opinions of someone else without proper acknowledgment.
  2. Borrowing the sequence of ideas, the arrangement of material, or the pattern of thought of someone else without proper acknowledgment.”  
(from Mason Honor Code online at <http://mason.gmu.edu/~montecin/plagiarism.htm>)
- b. Paraphrasing involves taking someone else’s ideas and putting them in your own words. When you paraphrase, you must cite the source.
- c. When material is copied word for word from a source, it is a direct quotation. You must use quotation marks (or block indent the text) and cite the source (i.e., Author, Year, page number).
- d. Electronic tools (e.g., SafeAssign) may be used to detect plagiarism if necessary.
- e. Plagiarism and other forms of academic misconduct are treated seriously and may result in disciplinary actions.

b. Students must follow the university policy for Responsible Use of Computing (See <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).

c. 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.

d. 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/>).

e. Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services and inform their instructor, in writing, as soon as possible. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (See <http://ods.gmu.edu/>).

- f. Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.
- g. 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/>).

### **Professional Dispositions**

Students are expected to exhibit professional behaviors and dispositions at all times.

### **Core Values Commitment**

The College of Education & Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <http://cehd.gmu.edu/values/>.

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



### **TK20 Performance-Based Assessment Submission Requirement**

Every student registered for any Educational Psychology course with a required performance-based assessment is required to submit this assessment, **Final Exam Grades** to Tk20 through Blackboard (regardless of whether the student is taking the course as an elective, a onetime course or as part of an undergraduate minor). Evaluation of the performance-based assessment by the course instructor will also be completed in Tk20 through Blackboard. Failure to submit the assessment to Tk20 (through Blackboard) will result in the course instructor reporting the course grade as Incomplete (IN). Unless the IN grade is changed upon completion of the required Tk20 submission, the IN will convert to an F nine weeks into the following semester.”

### Tentative Course Schedule

<b>Date</b>	<b>Class</b>	<b>Topic</b>	<b>Reading/Due</b>
1/19	1	Course Info Intro to Statistics & Frequency Distributions Intro to SPSS	Ch. 1 & 2 Appendix A: Basic Math Review
1/26	2	Central Tendency Variability	Ch. 3 & 4
2/2	3	Z-scores: location Standard Distributions	<b>HW #1</b>  Ch. 5
2/9	4	Probability	Ch. 6
2/16	5	Distributions of Sample Means	Ch.7
2/23	6	Hypothesis Testing & Power	<b>HW #2</b>  Ch. 8
3/1	7	z-tests and the t distribution	Ch. 9
3/8		Spring Break	
3/15	8	<b>MIDTERM EXAM</b>	
3/22	9	T-tests	Ch. 10 & 11
3/29	10	ANOVA	Ch. 12  <b>Article Summary #1</b>
4/5	11	Correlation & Simple Regression	<b>HW#3</b>  Ch. 14
4/12	12	Chi-Square	Ch. 15
4/19	13	ANOVA: Repeated Measures & Factorial	Ch. 13  <b>HW#4 (due 5/1 by 5 pm)</b>
4/26	14	Review	<b>Article Summary #2</b>
5/3		Reading Week	No class
5/10	15	<b>FINAL EXAM</b>	

*This schedule may be changed at the discretion of the professor or program dictate*