

**George Mason University**  
**College of Education and Human Development**  
**Educational Psychology**

EDRS 620 001 CRN 80480 – Quantitative Methods in Educational Research, 3 Credits  
Fall 2019 - Thursdays 4:30 – 7:10 p.m.  
Thompson Hall Room L018  
Fairfax Campus

**Faculty**

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**Prerequisites/Corequisites**

EDRS 590 or equivalent experience

**University Catalog Course Description**

This course examines fundamental concepts and methods of statistics as applied to educational problems, including descriptive and inferential statistics.

**Course Overview**

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. The course explores hypothesis testing, correlational techniques, t-tests, analysis of variance, post-hoc comparison, factorial designs, regression, and non-parametric statistics. Students learn through a combination of text reading assignments, data analysis and interpretation of SPSS (Statistical Package for Social Sciences) printouts, and application activities. The course lays the foundation for advanced study of quantitative analysis for students desiring to continue their studies in this area.

**Course Delivery Method**

This course will be delivered using a seminar and lab format.

**Learner Outcomes or Objectives**

This course is designed to enable students to do the following:

1. Understand basic concepts, terminology, and assumptions pertinent to statistical analyses;
2. Identify an appropriate statistical method 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.

### **Relationship to Program Standards**

In this course, the following Educational Psychology program standards will be addressed:

**Standard 3:** Knowledge of Educational Research and Assessment. Candidates will demonstrate an understanding of the basic concepts, principles, techniques, approaches, and ethical issues involved in educational research.

**Standard 4:** Analysis, Critique, and Evaluation of Educational Research. Candidates will use their knowledge of quantitative and qualitative research methodology to critically read and evaluate quantitative and qualitative research articles.

**Standard 6:** Communication and Dissemination of Educational Research. Candidates will demonstrate critical thinking, oral presentation, technological, and writing skills as they are used in the profession. These include: a. Knowledge and use of APA style, b. Oral presentations, c. Poster presentations, d. Article abstracts, e. Research proposals, f. Literature reviews, and g. Technological skills.

### **Required Texts**

Privitera, G. J. (2019). *Essential statistics for the behavioral sciences* (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.

### **Required Materials**

(1) Access to SPSS software. There are computer labs on campus that provide access to SPSS. You can also access SPSS through GMU's Virtual Computing Lab at <https://www.vcl.gmu.edu/>. Information about how to use the Virtual Computing Lab is available at <https://its.gmu.edu/service/virtual-computing-lab/>. 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.

(2) A simple nonprogrammable calculator that has a square root function.

### **Related Resource**

American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6<sup>th</sup> ed.). Washington, D. C.: American Psychological Association.

### **Class Preparation**

Information on course assignments, weekly quizzes, and notes for class will be available on the course Blackboard site.

### **Statistics Study Tips**

1. Read widely; then read some more.
2. "Google" difficult concepts. There is a lot of helpful statistics 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 it 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.

### **Course Performance Evaluation**

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

- **Quizzes (10%)**  
Each week there will be a short quiz posted in Blackboard. The quizzes are composed of short answer and multiple-choice items covering the 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 receive a 0 due to failure to complete it). You must complete the online quiz by midnight the day before class meets. I encourage you to take the quiz soon after the class meeting; the purpose of the quiz is to help you isolate key concepts from the class period and to focus your study time.
- **Homework Assignments (20%)**  
You will have 5 homework assignments. Assignments will be posted on Blackboard. Each 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 need to be completed by the beginning of the class on the due date. No late assignments will be accepted. Some questions will ask you to explain statistical concepts, some will ask you to work out problems, and others will require you to run analyses using SPSS and interpret the results. You should show all of your work for any problem that you complete and include appropriate computer printouts (**please cut and paste from SPSS into MS Word**). You may work together on your assignments; however, students should submit their own independent write-up of results.
- **Exams (50%)**  
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. The midterm exam is worth 25% and the final exam is worth 25%.
- **Article Results 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 I've selected for you. For the second article

summary, each student may select from options I will provide, or identify an empirical journal article in your area of interest that includes ANOVA and/or correlation. Students will read the entire article, identify key components of the methods/analysis, and write a short commentary/critique (3 pages maximum) of the Methods & Analysis section. Helpful hint: *Pay attention to the methods and analysis sections of articles from other courses or research projects. These are great candidates for this course requirement.*

### **Other Requirements**

**Class Attendance and Participation:** It is expected that all students will read assigned materials before coming to class, come to class on time, participate in class discussions & activities, and complete in-class assignments. Each class section 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 tied to the homework and course goals. Questions are encouraged.

**Blackboard:** 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 up 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 (703) 993-3141, or go to the 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 Rm 226.

### **Grading Scale**

Grades will be assigned based on the following:

A+	98 – 100%	B+	88 – 89%	C	70 – 79%
A	93 – 97%	B	83 – 87%	F	Below 70%
A-	90 – 92%	B-	80 – 82%		

Final grades are based on the assessments described above. “Extra Credit” is not available.

### **Late Assignments**

As a general rule, late papers/homework will not be accepted. If you believe you have EXCEPTIONAL circumstances and wish to discuss extra time to complete course work, contact me before the day the assignment is due (this discussion will involve sacrificing a portion of your grade for extra time).

### **Professional Dispositions**

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

### **Core Values Commitment**

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

**GMU Policies and Resources for Students** (see <https://cehd.gmu.edu/students/polices-procedures/>)

## Policies

- **Students must adhere to the guidelines of the Mason Honor Code** (see <https://catalog.gmu.edu/policieshonor-code-system/>).
- **Students must follow the university policy for Responsible Use of Computing** (see <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>)
- Students are responsible for the content of university communications sent to their Mason 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 with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <http://ds.gmu.edu/>)
- Students must silence all sound-emitting devices during class unless otherwise authorized by the instructor.

## Campus Resources

- Support for submission of assignments to TK20 should be directed to [tk20help@gmu.edu](mailto:tk20help@gmu.edu) or <https://cehd.gmu.edu/aero/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursesupport.gmu.edu/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>.

For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu>.

## Tentative Class Schedule

<b>Date</b>	<b>Class</b>	<b>Topic</b>	<b>Reading/Due</b>
8/29	1	Course Info Intro to Statistics & Frequency Distributions Intro to SPSS Central tendency	Ch. 1-3 Appendix A: Basic Math Review
9/5	2	Variability Probability Z-Scores: location	Ch. 4 & 5
9/12	3	Standard Distributions Distribution of Sample Means	<b>HW #1</b> Ch. 6
9/19	4	Hypothesis Testing & Power	Ch. 7
9/26	5	The t Distribution	<b>HW #2</b> Ch. 8
10/3	6	T-tests	Ch. 9 & 10
10/10	7	Catch-up/Review	<b>HW #3</b>
10/17	8	<b>Midterm Exam</b>	
10/24	9	ANOVA: One Way	<b>Article Summary #1</b> Ch. 11
10/31	10	ANOVA: Post hocs and within subjects	Ch. 11 continued
11/7	11	Correlation and Regression	<b>HW#4</b> Ch. 13
11/14	12	Chi-Square	Ch. 14
11/21	13	ANOVA: Two Way	<b>HW #5</b> Ch. 12
11/28	14	No Class – Thanksgiving	
12/5	15	Review	<b>Article Summary #2</b>
12/12	16	<b>Final Exam</b>	

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

Assessment: EDRS 620 Final Exam

Students will earn a percentage score that ranges from 0-100% on a final exam that includes (i) multiple-choice conceptual questions, (ii) interpretation of SPSS output, and a final section that requires the candidate to (iii) match research questions to appropriate statistical analyses.

Instead of reporting the percentage of points candidates earn on the assessment, candidates receiving a score of 90% - 100% will be reported as exceeding expectations, 80 – 89% are meeting expectations, 70-79% are approaching expectations, and candidates receiving a score of 69% or below are reported as not meeting expectations. This percentage will be noted for each major section of the final exam as well as for the overall exam percentage.

TK20 Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaching Expectations	Not Meeting Expectations
Final Exam: Part I Core statistical concepts (Multiple choice items)	90-100% Correct	80-89% correct	70-79% correct	69% or below correct
Final Exam: Part II Interpretation of SPSS output (Short answer items)	90-100% Correct	80-89% correct	70-79% correct	69% or below correct
Final Exam: Part III Identifying appropriate statistical analyses for a given research question (Matching items)	90-100% Correct	80-89% correct	70-79% correct	69% or below correct
Final Exam Overall: Percentage of points earned on Final Exam (across all 3 components: multiple-choice items, matching, and output analysis)	90-100% Correct	80-89% correct	70-79% correct	69% or below correct