

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

EDRS 811.DL1 – Quantitative Methods in Educational Research  
3 Credits, Spring 2021  
Mondays, 4:30-7:10 PM  
Online Course

**Faculty**

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**Prerequisites/Corequisites**

B- or higher and satisfactory completion of EDRS 810. Successful completion of EDRS 620 (or its equivalent) or permission of instructor. *Note: The first few weeks of the semester will be a review of material that you have already been exposed to (principles of research, descriptive statistics, normal distribution, hypothesis testing).*

**University Catalog Course Description**

Emphasizes advanced methods of conducting research using quantitative methods of data collection, and analysis appropriate for research in education. Includes design of experimental and quasi-experimental research studies, and methods of analysis appropriate to these studies, including analyzing variance and multiple linear regression.

**Course Overview**

The purpose of this course is to develop students' understanding of statistical ideas and procedures required for conducting statistical analyses 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 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 (i.e., journal articles), to analyze data using the Statistical Package for Social Sciences (SPSS), and to provide written report of methodology and results.

**Course Delivery Method**

This course will be delivered online (76% or more) using a synchronous format via Blackboard Learning Management system (LMS) housed in the MyMason portal. You will log in to the Blackboard (Bb) course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available on Jan 25, 2021.

**Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.**

### *Technical Requirements*

To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see:

[https://help.blackboard.com/Learn/Student/Getting\\_Started/Browser\\_Support#supported-browsers](https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers)

To get a list of supported operation systems on different devices see:

[https://help.blackboard.com/Learn/Student/Getting\\_Started/Browser\\_Support#tested-devices-and-operating-systems](https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems)

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a headset microphone for use with the Blackboard Collaborate web conferencing tool.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
  - Adobe Acrobat Reader: <https://get.adobe.com/reader/>
  - Windows Media Player:  
<https://support.microsoft.com/en-us/help/14209/get-windows-media-player>
  - Apple Quick Time Player: [www.apple.com/quicktime/download/](http://www.apple.com/quicktime/download/)

### *Expectations*

- Course Week:  
Our course week will begin on the day that our synchronous meetings take place as indicated on the Schedule of Classes.
- Log-in Frequency:  
Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least three times per week. In addition, students must log-in for all scheduled online synchronous meetings.
- Participation:  
Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.

- Technical Competence:  
Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- Technical Issues:  
Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.
- Workload:  
Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.
- Instructor Support:  
Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.
- Netiquette:  
The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words.* Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.
- Accommodations:  
Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

## Learner Outcomes or Objectives

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

- (1) Understand the logic of hypothesis testing, type 1 and 2 error, and statistical power;
- (2) Demonstrate a conceptual understanding of the following statistical techniques: one-way, two-way, and three-way ANOVA, part and partial correlation, ANCOVA, and simple and multiple regression;
- (3) Demonstrate via linear equation and explain each of the techniques listed above in terms of the general linear model;
- (4) Select and justify an appropriate test statistic for a particular hypothesis;
- (5) Explain and examine underlying assumptions of each analysis as well as make recommendations for analysis if the assumptions are not upheld;
- (6) Develop SPSS computer skills necessary for conducting statistical analyses;
- (7) Write-up reports of statistical analyses using correct APA format;
- (8) Read, understand, and interpret results of all analyses covered in the course.

## Professional Standards

Not Applicable

## Required Texts

(1) Hahs-Vaughn, D., Lomax, R. (2020). *An Introduction to Statistical Concepts* (4<sup>th</sup> ed.). New York: Routledge, <https://doi-org.mutex.gmu.edu/10.4324/9781315624358>

(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 <https://its.gmu.edu/service/citrix-virtual-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.

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

## 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).

- **Assignments and/or Examinations**

- **Online Quizzes (10%):** There will be a short quiz posted on Blackboard immediately on Mondays. The quizzes are composed of short answer and multiple-choice items which will cover the basic concepts presented in class and in the textbook. 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 **Sundays at midnight**.
- **Homework Assignments (20%):** You will have 6 homework assignments. Assignments will be posted on Mondays. All assignments need to be completed by **Sundays at midnight**. 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 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 to Word). You may work together on your assignments; however, students should submit their own independent write-up of results.
- **Exams (40%):** The two online 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 20% and the final exam is worth 20%.
- **Understanding Research Article Methods/Analysis (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 the required statistical tests. 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 analyses sections of articles from other courses or research projects. These are great candidates for this course requirement.

- **Other Requirements**

- **Participation (10%):** Students should ask their own questions or reply back to the instructor's comments, or share their thoughts on other students' questions on BB Discussion Board **at least once every week.**

- **Grading**

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%		

## Professional Dispositions

See <https://cehd.gmu.edu/students/polices-procedures/>

## Class Schedule

Date	Class	Topic	Reading/Due
1/25	1	Review of <ul style="list-style-type: none"> <li>▪ Scale of measurement</li> <li>▪ Frequency distribution</li> <li>▪ Central tendency</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ch. 1 (1.3-1.5)</li> <li>▪ Ch. 2 (2.1-2.5)</li> <li>▪ Ch. 3 (3.2-3.4)</li> <li>▪ Quiz (class 1 review) posted</li> </ul>
2/1	2	Review of <ul style="list-style-type: none"> <li>▪ Variability</li> <li>▪ Graphical representation</li> <li>▪ Introduction to SPSS</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ch. 2 (2.1-2.5)</li> <li>▪ Ch. 3 (3.2-3.4)</li> <li>▪ Quiz (class 2 review) posted</li> </ul>
2/8	3	<ul style="list-style-type: none"> <li>▪ Normal distribution</li> <li>▪ Standard scores</li> <li>▪ Standard error</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ch. 4 (4.1-4.3)</li> <li>▪ Ch. 5 (5.2)</li> <li>▪ Quiz (class 3 review) posted</li> <li>▪ Homework 1 posted</li> </ul>
2/15	4	<ul style="list-style-type: none"> <li>▪ Hypothesis testing</li> <li>▪ Power, effect size, confidence intervals</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ch. 6 (all of 6)</li> <li>▪ Quiz (class 4 review) posted</li> </ul>
2/22	5	<ul style="list-style-type: none"> <li>▪ T-tests (independent and dependent)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ch. 7 (all of 7)</li> <li>▪ Quiz (class 5 review) posted</li> <li>▪ Homework 2 posted</li> </ul>
3/1	6	<ul style="list-style-type: none"> <li>▪ Chi-square tests</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ch. 8 (8.2-8.3)</li> <li>▪ Quiz (class 6 review) posted</li> <li>▪ Article summary 1 posted (Due: 4/4)</li> </ul>

3/8	7	▪ Review & midterm prep	▪ <a href="#">Homework 3 posted</a>
3/15	8	<b>Midterm Exam</b>	
3/22	9	▪ One-factor ANOVA	▪ Ch. 11 (11.1, 11.4-11.5) ▪ Ch. 12 (12.1-12.2, 12.4) ▪ <a href="#">Quiz (class 9 review) posted</a>
3/29	10	▪ Factorial ANOVA	▪ Ch. 13 (13.1, 13.4, 13.6) ▪ <a href="#">Quiz (class 10 review) posted</a> ▪ <a href="#">Homework 4 posted</a>
4/5	11	▪ Correlation and Regression	▪ Ch. 10 (10.1-10.5) ▪ Ch. 17 (17.1-17.3, 17.5, 17.7) ▪ <a href="#">Quiz (class 11 review) posted</a>
4/12	12	▪ Multiple Regression	▪ Ch. 18 (18.1-18.3, 18.5,18.7) ▪ <a href="#">Quiz (class 12 review) posted</a> ▪ <a href="#">Homework 5 posted</a> ▪ <a href="#">Article summary 2 posted (Due: 5/4)</a>
4/19	13	▪ ANCOVA ▪ Repeated measures	▪ Ch. 14 (14.1-14.2, 14.4, 14.6) ▪ Ch. 15 (15.4, 15.6, 15.10) ▪ <a href="#">Quiz (class 13 review) posted</a> ▪ <a href="#">Homework 6 posted</a>
4/26	14	▪ Review & final exam prep	
5/3	15	<b>Final Exam</b>	

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

## 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: <http://cehd.gmu.edu/values/>.

## GMU Policies and Resources for Students

### *Policies*

- Students must adhere to the guidelines of the Mason Honor Code (see <https://catalog.gmu.edu/policies/honor-code-system/>).
- Students must follow the university policy for Responsible Use of Computing (see <https://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 <https://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 <https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

### **Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking:**

As a faculty member, I am designated as a “Responsible Employee,” and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason’s Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance from Mason’s Title IX Coordinator by calling 703-993-8730, or emailing [titleix@gmu.edu](mailto:titleix@gmu.edu).

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

