

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

EDRS 220-DL1: Introduction to Applied Quantitative Analysis in the Social Sciences  
3 Credits Fall 2024  
MW / 10:30 – 11:45 AM / Online live video section through Zoom

**Faculty**

Name: Zikun Li  
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Office Hours Location: Zoom link found on Bb  
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**Prerequisite**

NONE

**University Catalog Course Description**

Develops fundamental concepts and methods of statistics in social science settings. Explores applications of descriptive and inferential statistics including hypothesis testing and basic correlational and comparative methods.

**Mason Core**

EDRS 220 fulfills the Mason Core Quantitative Reasoning requirement. For more information, please see the Mason Core website, <https://catalog.gmu.edu/mason-core/>.

**Course Overview**

EDRS 220 is an undergraduate quantitative analysis course that facilitates student understanding of the basic concepts and principles of descriptive and inferential statistics through the use of social science applications. It emphasizes comprehension, skill development and application of statistical knowledge to quantitative inquiry in education, exercise science, and other social sciences. Students learn through a combination of text reading assignments, data analysis, and interpretation of R (statistical environment) printouts with a *focus on application activities*.

**Course Delivery Method**

This course will be delivered online (76% or more) using **synchronous** format via Mason's Learning Management System (LMS). You will log in to the course site using your Mason email name (everything before @gmu.edu) and email password. The course site will be available on the first day of the course. To access your course in Blackboard Learn: <https://mymasonportal.gmu.edu/>

**Under no circumstances may students participate in online class sessions while operating motor vehicles.**

**Learner Objectives**

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

- (1) Understand basic concepts and terminology pertinent to statistical analyses;
- (2) Formulate a problem quantitatively [Mason Core Objective #2];
- (3) Identify the type of statistic appropriate for a given research problem;
- (4) Solve a problem with appropriate arithmetical, algebraic, and/or statistical method [Mason Core Objective #2];
- (5) Interpret quantitative information (i.e., formulas, graphs, tables, figures) [Mason Core Objective #1];
- (6) Draw inferences from quantitative information (i.e., formulas, graphs, statistical output) [Mason Core objective #1];
- (7) Evaluate logical arguments using quantitative reasoning [Mason Core Objective #3];
- (8) Communicate and present quantitative findings clearly and effectively [Mason Core Objective #4].

### **Required Materials:**

Salkind N. J. & Shaw. L A. (2020). *Statistics for people who (think they) hate statistics using R*. Sage.

Access to R software. R is free and open source. R can be installed on almost any computer with any operating system (e.g., Windows, Mac, Linus). There are also computer labs on campus that provide access to R. Instructions for downloading *Base R* and *R Studio* on both Mac and PC are available on Blackboard.

A simple nonprogrammable calculator that has a square root function.

### **Technical Requirements**

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

- High-speed internet access with updated browsers.
  - Blackboard Learn supported browsers:  
[https://help.blackboard.com/Learn/Student/Ultra/Getting\\_Started/Browser\\_Support](https://help.blackboard.com/Learn/Student/Ultra/Getting_Started/Browser_Support)
- Consistent and reliable access to GMU email and Blackboard, as these are the official methods of communication for this course.
- Speakers and a microphone or a microphone-enabled headset for use with the synchronous web conferencing tools.
- Note that 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.

### **Expectations**

- Course Week:

Our course week will begin on the day that our synchronous meetings take place as indicated on the Schedule of Classes.

- Course Materials:  
Information on course assignments, weekly quizzes, and notes for class lectures are available on the course Blackboard site. Extra resources have been curated to support your learning on Blackboard. Students are encouraged to actively engage with the course Blackboard site for both remediation and enrichment opportunities.
- Log in Frequency:  
Students must actively check the course LMS site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 2 times per week. In addition, students must log in for all scheduled online synchronous meetings.
- Participation:  
Students are expected to come to class on time, **keep camera on**, complete assignments, and participate in class activities. If you need to miss a class due to an emergency situation, it is expected to send a written notification (via email) to the instructor as soon as possible. **Failure to notify the instructor in advance may result in a negative impact on your “in-class” participation points, even if you submit all your in-class activities.**
- 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 through Zoom setting. ***Students should email the instructor to schedule a one-on-one session, including the specific questions that want to be addressed.***
- 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.

### **Course Performance Evaluation:**

Students are expected to submit all assignments on time in the manner outlined by the instructor.

- **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 are expected to complete the online quiz by midnight the day before the first class meeting of the following week. *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.*
- **Application Assignments (35%):** You will have 5 homework assignments. **That said, each assignment is 7% of your grade.** Assignments will be posted on Blackboard. Each assignment will include a scenario and accompanying data necessary to complete the problem set. These assignments are like mini projects. **All assignments need to be completed by the due date.** *For late assignment submitted within a week after the due date, there will be an automatic deduction of 10 points. Submissions made after this one-week grace period will not be accepted.* Scenarios will require you to explain statistical concepts, work out problems, run analyses using R and interpret results. You should show all your work for problems that you complete and include appropriate computer printouts **(please copy and paste output from R to a Word document)**. There is a targeted written or oral explanation of the results required in each of these assignments.
- **“In Class” Activities & Participation (15%):** Students will complete in-class problem solving activities in small groups or individually (“Class Activity Submission” or “CAS”). Each activity will require data analyses and a lab write-up or questionnaire submitted at the completion of the tasks. Some activities will include explanation and presentation of findings to the class.
- **Exams (40%):** Three exams will cover the material from the class and textbook and include multiple choice and short answer application questions as well as interpretation of statistical output. *The first two exams are worth 10% each and the final, cumulative exam is worth 20%.*

**\*\*\* ATTENTION:** This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be built into your computer (internal webcam) or can be the type of webcam that plugs in with a USB cable (external webcam). Watch this [short video](#) to get a basic understanding of LockDown Browser and the webcam feature. A [Quick Start Guide for Students Installment and Use](#) can be found here. ***It is your responsibility to set up the necessary arrangements before the first exam.*** If you have any issues with it, please contact George Mason ITS Support Center at 703-993-8870, or [support@gmu.edu](mailto:support@gmu.edu).

**Grading Scale:** Grades will be assigned based on the following:

A+	98-100%	B+	88-89%	C+	78-79%	D	60-69%
A	93-97%	B	83-87%	C	73-77%	F	Below 60%
A-	90-92%	B-	80-82%	C-	70-72%		

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

**Late Assignments:** 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).

### **Use of Generative AI**

Use of Generative AI tools should be used following the fundamental principles of Mason’s Academic Standards. ***This includes being honest about the use of these tools for submitted work and including citations when using the work of others, whether individual people or Generative AI tools. NO AI IS ALLOWED DURING THE EXAMS.***

### **Professional Dispositions (CEHD Student Guide)**

Throughout study in the College of Education and Human Development, students are expected to demonstrate behaviors that reflect the positive dispositions of a professional. See <https://cehd.gmu.edu/students/polices-procedures/>

### Tentative Class Schedule

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

Week	Date	Topic	Reading	Due
1	M 8/26	Intro to Statistics & Frequency Distributions	Chs. 1-3	<ul style="list-style-type: none"> <li>Quiz – Topic 1</li> </ul> <p style="text-align: center;"><i>Due: 8/27</i></p>
	W 8/28	Learning about R		
2	M 9/2	<b>No Class (Labor Day)</b>		
	W 9/4	Central Tendency and Variability (1)	Ch. 4	
3	M 9/9	Central Tendency and Variability (2) <i>Last Day to Drop (100% Refund)</i>	Ch. 5	<ul style="list-style-type: none"> <li>Quiz – Topic 2</li> <li>CAS 1&amp;2</li> </ul> <p style="text-align: center;"><i>Due: 9/10</i></p>
	W 9/11	Using descriptives and graphs	Ch. 6	
4	M 9/16	Correlation	Ch. 7	<ul style="list-style-type: none"> <li>Quiz – Topic 3</li> <li>CAS 3</li> </ul> <p style="text-align: center;"><i>Due: 9/17</i></p>
	W 9/18	Validity and Reliability	Ch. 8	<ul style="list-style-type: none"> <li><b>HW#1</b></li> </ul> <p style="text-align: center;"><i>Due: 9/22</i></p>
5	M 9/23	Hypothesis testing	Ch. 9	<ul style="list-style-type: none"> <li>Quiz – Topic 4</li> <li>CAS 4</li> </ul> <p style="text-align: center;"><i>Due: 9/24</i></p>
	W 9/25	Exam #1 Review		
6	M 9/30	<b>Exam #1</b>		

	W 10/2	Probability and Z score	Ch. 10	
7	M 10/7	Statistical significance	Ch. 11	<ul style="list-style-type: none"> <li>• Quiz – Topic 5</li> <li>• CAS 5</li> </ul> <p style="text-align: center;"><i>Due: 10/8</i></p>
	W 10/9	Z-test and Distribution of sample mean (1)	Ch. 12	
8	M 10/14	<b>No Class (Fall Break)</b>		
	W 10/16	Z-test and Distribution of sample mean (2)		<ul style="list-style-type: none"> <li>• Quiz – Topic 6</li> </ul> <p style="text-align: center;"><i>Due: 10/20</i></p>
9	M 10/21	The t distribution and independent t-tests (1)	Ch. 13	<ul style="list-style-type: none"> <li>• <b>HW#2</b></li> </ul> <p style="text-align: center;"><i>Due: 10/27</i></p>
	W 10/23	The t distribution and independent t-tests (2)		
10	M 10/28	Dependent t-tests	Ch. 14	<ul style="list-style-type: none"> <li>• Quiz – Topic 7</li> <li>• <b>HW#3</b></li> </ul> <p style="text-align: center;"><i>Due: 11/1</i></p>
	W 10/30	Exam #2 Review		
11	M 11/4	<b>Exam #2</b>		
	W 11/6	One-way ANOVA (1)	Ch. 15	
12	M 11/11	One-way ANOVA (2)		<ul style="list-style-type: none"> <li>• Quiz – Topic 8</li> </ul> <p style="text-align: center;"><i>Due: 11/12</i></p> <ul style="list-style-type: none"> <li>• <b>HW#4</b></li> </ul> <p style="text-align: center;"><i>Due: 11/17</i></p>

	W 11/13	Chi-square tests – GOF	Ch. 19	<ul style="list-style-type: none"> <li>• Quiz – Topic 9.1</li> <li>• CAS 9.1</li> </ul> <p style="text-align: center;"><b><i>Due: 11/19</i></b></p>
13	M 11/18	Chi-square tests – TOI		<ul style="list-style-type: none"> <li>• Quiz – Topic 9.2</li> <li>• CAS 9.2</li> </ul> <p style="text-align: center;"><b><i>Due: 11/25</i></b></p>
	W 11/20	Simple regression	Chs. 17-18	
14	M 11/25	Simple regression (2)		
	W 11/27	<b>No Class (Thanksgiving)</b>		
15	M 12/2	Multiple regression		<ul style="list-style-type: none"> <li>• Quiz – Topic 10</li> </ul> <p style="text-align: center;"><b><i>Due: 12/3</i></b></p>
	W 12/4	Choosing the right test		<ul style="list-style-type: none"> <li>• <b>HW#5</b></li> </ul> <p style="text-align: center;"><b><i>Due: 12/8</i></b></p>
16	M 12/9	Final Exam Review		
	W 12/11	<b>Final Exam 10:30 am – 1:15 pm</b>		

### CEHD Commitments

The College of Education and Human Development is committed to fostering collaboration and community, promoting justice and equity, and advancing research-informed practice. Students are expected to adhere to, and contribute to, these commitments, the CEHD Mission, and Core Values of George Mason University. More information can be found here:

<https://cehd.gmu.edu/about/culture/>

### GMU Policies and Resources for Students



### *Policies*

- Students must adhere to Mason’s Academic Standards (see <https://catalog.gmu.edu/policies/academic-standards/>)
- 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 VIA should be directed to [viahelp@gmu.edu](mailto:viahelp@gmu.edu) or <https://cehd.gmu.edu/aero/assessments>.
- Questions or concerns regarding use of your LMS should be directed to:
  - Blackboard Learn: <https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/>
  - Canvas: <https://its.gmu.edu/service/canvas/>
- For information on student support resources on campus, see: <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>
  - TimelyCare: <https://caps.gmu.edu/timelycare-services/>
  - Writing Center: <https://writingcenter.gmu.edu/>

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

As a faculty member, I am designated as a “Non-Confidential Employee,” and must report all disclosures of sexual assault, sexual harassment, 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 or support measures 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/> .**