

George Mason University
College of Education and Human Development
Research Methods

EDRS 220 - 001: Applied Quantitative Analysis in the Social Sciences
3 Credits Fall 2021
TR / 3:00pm - 4:15pm / Thompson Hall L014

Faculty

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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 SPSS printouts (Statistical Package for Social Sciences), with a *focus on application activities*.

Learner Objectives: This course is a one-semester introduction to applications of statistical analysis. By the end of the semester, it is expected that you will be able to:

- (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].

Course Delivery Method: The class sessions will include lecture, small group discussion, and analysis of statistical output. **Questions are encouraged.** The activity portion of the class will provide time for hands-on and computer work that is directly related to the homework and course goals.

Class Attendance & Participation: Students are expected to come to class on time, complete assignments, and participate in class discussions. Information on course assignments, weekly quizzes, and notes for class lectures are available on the course Blackboard site.

For assistance with Blackboard students may email 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 (9703) 993-8870 or go to the counter in Innovation Hall.

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. [You will get information about how to access and download R in class.]

A simple nonprogrammable calculator that has a square root function.

Course Performance Evaluation:

- **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 the specified date listed on Blackboard. *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. 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. No late assignments will 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. At least 2 of the assignments will be written (i.e., typed)

documents and at least 2 will be oral video presentations with ppt slides. The 5th presentation may either written or oral.

- **“In Class” Activities & Participation (15%):** Students will complete in-class problem solving activities in small groups. 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%

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

A+	98-100%	B+	88-89%	C+	78-79%	D	60-69%
A	93-100%	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: *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).

Professional Dispositions

Students are expected to exhibit professional behaviors and dispositions at all times. See <https://cehd.gmu.edu/students/polices-procedures/>

Tentative Course Schedule

Week (2 classes per week)	Dates	Topics	Readings/Due
1	T 8/24 R 8/26	<i>Course Info / Describing Data</i> Intro to Statistics & Frequency Distributions Learning about R	Ch. 1-3 Appendix A
2	T 8/31 R 9/2	<i>Explaining the Meaning of a Score</i> Central Tendency/Variability	Ch. 4-5
3	T 9/7 R 9/9	Using Descriptives and Graphs Correlation/Validity/Reliability	Ch. 6
4	T 9/14 R 9/16	<i>To infer...or not to infer?</i> Hypothesis Testing <i>Sept 14 Last Day to Drop (50% Refund)</i>	HW #1 Ch. 7-8 Ch. 9
5	T 9/21 R 9/23	Review Exam #1	
6	T 9/28 R 9/30	Probability, Location of Z scores	Ch. 10
7	T 10/5 R 10/7	Statistically Significant <i>My sample...among many, many samples</i> Distributions of Sample Means/Z tests	Ch. 11-12 HW #2
8	T 10/12 R 10/14	NO CLASS Z test Continued	Ch. 13-14
9	T 10/19 R 10/21	<i>Relying only on my data / Comparing means</i> The t distribution: t-tests Independent & Dependent t-tests	Ch. 13-14 HW #3
10	T 10/26 R 10/28	Review Exam #2	
11	T 11/2 R 11/4	Asynchronous Class One-way ANOVA	Ch. 15 HW #4
12	T 11/9 R 11/11	<i>Matching categorical patterns</i> Chi-Square Tests	Ch. 19
13	T 11/16 R 11/18	Chi-Square Tests (cont'd) <i>Patterns and relationships in data</i> Correlation & Simple Regression	Ch. 17-18
14	T 11/23 R 11/25	Multiple Regression NO CLASS W 11/25 - Thanksgiving	HW #5
15	T 11/30 R 12/2	<i>Choosing the Right Test</i> Review	Ch. 18
16	R 12/9	FINAL EXAM 3:00 pm - 4:15 pm	

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 <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 <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 or <https://cehd.gmu.edu/aero/assessments> . 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.

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