EDRS 620 B01: Quantitative Methods in Educational Research
Summer 2018

Course Time: Tuesday/Thursday 7:20- 10:00 p.m.
Course Location: Room L018 Thompson Hall

Instructor: Angela Miller, Ph. D.
Office Hours: by appointment
Office Hours Location: Room 2007 West Building
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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) Privitera, G. J. (2019). Essential Statistics for the Behavioral Sciences (2nd ed.). Thousand Oaks, CA: Sage.

(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. Information about how to use the virtual computer library is available at http://itservices.gmu.edu/services/view-service.cfm?customel_dataPageID_4609=5689. 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.

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

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;

(3) Interpret statistical findings;
(4) Compute, by hand and computer, basic statistical analyses;
(5) Design the basic components of a small-scale quantitative research study;
(6) Write clearly and coherently about the conceptual framework, research questions and methods used in a study;
(7) Report statistical results in correct APA format.

Class Preparation: Information on course assignments, weekly quizzes, and notes for class lectures are available on the course Blackboard site.

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.

ASSESSMENT:
- **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 <u>cannot</u> 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.*

- **Homework Assignments (20%):** You will have 4 homework assignments. Assignments will be posted weekly on Blackboard. 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 need to be completed by the <u>beginning of the class</u> on the due date. <u>No late assignments will be accepted.</u> 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, <u>students should submit their own independent write-up of results</u>.

- **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 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/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 analyses sections of articles from other courses or research projects. These are great candidates for this course requirement.*

Other Requirements

<u>Class Attendance & Participation</u>: 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 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.*

<u>Blackboard</u>: 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, 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.

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.

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.

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/.

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 http://ods.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 or https://cehd.gmu.edu/aero/tk20. Questions or concerns regarding use of Blackboard should be directed to http://coursessupport.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 Course Schedule

Date	Class	Topic	Reading/Due
6/4	1	Course Info Intro to Statistics & Frequency Distributions Intro to SPSS Central Tendency	Ch. 1 -3 Appendix A: Basic Math Review
6/6	2	Variability Probability Z-scores: location	Ch. 4 & 5
6/11	3	Standard Distributions Distributions of Sample Means	**HW #1** Ch. 6
6/13	4	Hypothesis Testing & Power	Ch. 7
6/18	5	The t distribution	Ch. 8 **HW #2**
6/20	6	T-tests	Ch. 9 & 10
6/25	7	Catch up/Review	**HW #3**
6/27	8	**Midterm Exam**	
7/2 & 7/4		**No Class Summer Recess**	
7/9	9	ANOVA: One Way	Ch. 11 **Article Summary #1**
7/11	10	ANOVA : Post hocs and within subjects	Ch. 11 (cont.)
7/16	11	Correlation and Regression	Ch. 13 **HW #4**
7/18	12	Chi-Square	Ch. 14
7/23	13	Review	**Article Summary #2**
7/25	14	**FINAL EXAM**	

Assessment: EDRS 620 Final Exam

Student 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 that candidate to (iii) match research questions to appropriate statistical analyses. (See core concepts for 620 for detail.)

Instead of reporting the percentage of points candidates earned on the assessment, candidates receiving a score of 90-100% will be reported as exceeding expectation, 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 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: matching, output analysis, multiple choice items)	90-100% correct	80-89% correct	70-79% correct	69% or below correct