

**GEORGE MASON UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
EDUCATIONAL PSYCHOLOGY**

EDRS 620 (B02)

Quantitative Inquiry in Education (3 credits)

Summer 2017, Session B

Mondays & Wednesdays 4:30pm-7:10pm

Thompson L014

PROFESSOR

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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.

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. The course explores hypothesis testing, correlational techniques, t-tests, analysis of variance, post-hoc comparison, factorial designs, regression, and non-parametric statistics. An emphasis is placed on 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. Gravetter, F. J. & Wallnau, L. B. (2011). *Essentials of Statistics for the Behavioral Sciences* (9th ed.). Belmont, CA: Wadsworth/Thomson Learning. ISBN:978-1-133-95657-0
 - 8th edition is also fine to use but there may be some differences in the assigned readings. The student is responsible for determining these.
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.

NATURE OF COURSE DELIVERY

The class sessions will include lecture, small group discussion, and discussion of SPSS output in a computer classroom. *Questions are encouraged.* The lab portion of the class will provide time for hands-on computer work that is directly related to the homework and course goals.

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.

COURSE EXPECTATIONS

It is expected that students will:

1. Read all assigned materials before coming to class
2. Participate in classroom activities that reflect critical reading of materials
3. Complete in-class assignments, homework assignments, and quizzes
4. Complete an in class midterm and final examination
5. Attend each class session

COURSE GOALS

By the end of the semester, it is expected that students 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
4. Interpret statistical findings
5. Compute, by hand and computer, basic statistical analyses
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

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 demonstrated 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.

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.

COURSE EVALUATION

1. Quizzes (10%)

Timed online quizzes (usually 25 minutes) will be given once a week via Blackboard, assessing material discussed since the last quiz. The quizzes are composed of short answer and multiple choice items which will cover the basic concepts presented in class and in the textbook. Students are expected to complete the quizzes independently by noon on the day indicated and may use only one 8.5 x 11 piece of paper with notes on the front and back. Quizzes are designed to provide students (and instructor) feedback about students' course progress. Students who miss a quiz may not make up the quiz unless previous arrangements have been made. The lowest, non-missed quiz grade will be dropped. Quiz grades cannot lower students' overall course grade (unless they received 0's on quizzes due to failure to complete them). Students are encouraged to take the quizzes soon after the class meeting; the purpose of the quiz is to help isolate key concepts from the class period and to focus study time.

2. Homework Assignments (20%)

Students will complete homework assignments throughout the semester. All assignments will be posted on Blackboard and are due at the beginning of the class on the due date. These assignments are meant to apply and practice the course material.

For assigned problem sets, handwritten work is acceptable but should be neat and readable. Questions will ask students to explain statistical concepts, work out problems, and or run analyses using SPSS and interpret results. Students should show all of the work for any problem completed. When referring to computer printouts cut and paste the appropriate output into the homework assignment. Be sure to label and explain clearly. Students may consult with each other for these assignments but each student is to turn in a complete homework assignment. Students should retain a copy of all submitted homework assignments.

3. Midterm and Final Examination (25% each—50% total)

The two exams, as indicated in the course schedule, will be given assessing material from the class and textbook (e.g., conceptual questions, application of skills, interpretation of SPSS output) using multiple choice, matching, and short answer questions.

**It is the student's responsibility to submit the results of the final exam assessment via TK20 on Blackboard.

4. Article 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 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.*

Grading Policy

Each student's final grade for the class will be based on the following:

A+ = 98 – 100%	A = 93 – 97.99%	A- = 90 – 92.99%
B+ = 88 – 89.99%	B = 83 – 87.99%	B- = 80 – 82.99%
C = 70 – 79.99%	F < 70%	

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT STATEMENT OF EXPECTATIONS:

Student Expectations:

- **Honor Code:** Students must adhere to the guidelines of the George Mason University Honor Code [See <http://oai.gmu.edu/the-mason-honor-code/>].
 - Students must not give or receive unauthorized assistance.
 - Plagiarism is also a violation of the honor code. Please note that:
 - “Plagiarism encompasses the following:
 1. Presenting as one's own the words, the work, or the opinions of someone else without proper acknowledgment.
 2. Borrowing the sequence of ideas, the arrangement of material, or the pattern of thought of someone else without proper acknowledgment.”
 (from Mason Honor Code online at <http://mason.gmu.edu/~montecin/plagiarism.htm>)
 - Paraphrasing involves taking someone else's ideas and putting them in your own words. When you paraphrase, you need to cite the source.
 - When material is copied word for word from a source, it is a direct quotation. You must use quotation marks (or block indent the text) and cite the source.
 - Electronic tools (e.g., SafeAssign) may be used to detect plagiarism if necessary.
 - Plagiarism and other forms of academic misconduct are treated seriously and may result in disciplinary actions.
- **Responsible Use of Computing:** Students must follow the university policy for Responsible Use of Computing [See <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>]
- **Disability Services and Accommodations:** Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS). Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor [See <http://ods.gmu.edu/>].
- **Email Communication:** Students are responsible for the content of university communications sent to their George Mason University 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.
- **Sound Emitting Devices:** Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.
- **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/>

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/>.
- The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing [See <http://writingcenter.gmu.edu/>].
- The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See <http://caps.gmu.edu/>].
- The Student Support & Advocacy Center staff helps students develop and maintain healthy lifestyles through confidential one-on-one support as well as through interactive programs and resources. Some of the topics they address are healthy relationships, stress management, nutrition, sexual assault, drug and alcohol use, and sexual health (see <http://ssac.gmu.edu/>). Students in need of these services may contact the office by phone at 703-993-3686. Concerned students, faculty and staff may also make a referral to express concern for the safety or well-being of a Mason student or the community by going to <http://ssac.gmu.edu/make-a-referral/>.
- For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website [See <http://gse.gmu.edu/>]

CORE VALUES COMMITMENT

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



PROFESSIONAL DISPOSITIONS

Students are expected to exhibit professional behaviors and dispositions at all times. In particular, students are reminded of the following dispositions identified by CEHD and the Educational Psychology program:

CEHD Dispositions

- I. **Commitment to the Profession** (e.g., promoting exemplary practice, excellence in teaching and learning)
- II. **Commitment to Honoring Professional Ethical Standards** (e.g., fairness, honesty, integrity, respect for colleagues and students)

- III. **Commitment to Key Elements of Professional Knowledge** (e.g., belief that all students can learn, high standards, respect for diverse talents, abilities, and perspectives)
- IV. **Commitment to Being a Member of a Learning Community** (e.g., self and collective improvement, responsibility, collaboration)
- V. **Commitment to Democratic Values and Social Justice** (e.g., respect for opinions and dignity of others, appreciate and integrate multiple perspectives)

Educational Psychology Dispositions

- I. **Commitment to the field of Educational Psychology** (e.g., excellence in applying research to teaching, learning, and assessment)
- II. **Commitment to ethical research with human subjects** (e.g., respect for persons, beneficence—do not harm, justice)
- III. **Commitment to empirical inquiry** (e.g., commitment to research-based evidence to inform decisions, value methodological rigor in research)
- IV. **Commitment to the Learner-Centered Principles of the American Psychological Association** (e.g., cognitive and metacognitive, motivational and affective, development and social, and individual difference factors; <http://www.apa.org/ed/governance/bea/learner-centered.pdf>)

See http://cehd.gmu.edu/assets/docs/educational_psychology/EdPsy%20CV,%20PS,%20Disp,%20Sig.pdf for more information on these dispositions.

ADDITIONAL CLASS POLICIES

Late Assignments

Unless otherwise indicated, assignments are due at the start of class on the assigned due date. If an assignment must be turned in late or outside of class, students may give the assignment to me in person, leave the assignment in my faculty mailbox (West Room 2108), or post the document to Blackboard. If an assignment is left in my mailbox, send an email to indicate that it is there. **DO NOT** slide assignments under my office door. Late assignments will be marked down 5% for each day the assignment is late.

Electronic Device Use in Class

During class time, please refrain from checking email or conducting activities on the computer, cell phone or other electronic device that are not directly related to the class session.

Class Environment

Help to foster a positive learning environment by respecting the opinions and contributions of others. Also, cell phones should be turned off or put on silent mode so as to not affect the learning of those around you.

TENTATIVE COURSE SCHEDULE

Date	Class	Topic	Reading/Assignment Due
6/5	1	Course Info Intro to Statistics & Frequency Distributions Intro to SPSS Central Tendency	Ch. 1 -3 Appendix A: Basic Math Review
6/7	2	Variability Z-scores Standard Distributions	Ch. 4 & 5 Student Information “Quiz”
6/12	3	Probability Distributions of Sample Means	Ch. 6 & 7 Quiz #1 HW #1: Distributions, Measures of Central Tendency and Variability
6/14	4	Hypothesis Testing, Effect Size, & Power	Ch. 8
6/19	5	Introduction to the t Statistic	Ch. 9 Quiz #2 HW #2: Z-Scores and the Normal Distribution
6/21	6	t-Tests for Two Samples	Ch. 10 & 11
6/26	7	Catch up/Review	HW #3: Hypothesis Tests of the Mean Article Summary #1 Quiz #3
6/28	8	MIDTERM EXAM	
7/3		4th of July Holiday—NO CLASS	
7/5	9	ANOVA: One-way	Ch. 12
7/10	10	Correlation & Simple Regression	Ch. 14 Quiz #4
7/12	11	Reading Multiple Regression Chi-Square: Test for Goodness of Fit and Independence	Usher & Pajares (2006) Ch. 15 HW #4: ANOVA
7/17	12	ANOVA (cont.) : Repeated Measures	Ch. 13 Quiz #5 HW #5: Correlation and Simple Regression

7/19	13	ANOVA (cont.): Factorial	Ch. 13 HW #6: Chi-Square
7/24	14	Final Exam Review	HW #7: ANOVA (cont.) and Synthesis of the Semester Quiz #6
7/26	15	FINAL EXAM	Article Summary #2

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.

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