

ERM 680: Intermediate Statistical Methods in Education

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Course Overview

This course will help you develop the skills needed to apply and interpret descriptive and inferential statistics. You will learn the mechanics of the most widely used statistical procedures, when and why to apply these procedures, the assumptions that underlie their use, and how to interpret the results they provide. You will learn to enter data, conduct analyses, and interpret results using the statistical computing package SPSS.

Course Objectives

Students should be able to:

- Appropriately use statistical terms
- Apply statistical equations by hand (requires an understanding of basic notation)
- Describe a set of data based on exploratory data analysis and descriptive statistics
- Choose the appropriate statistical analysis to employ given a research question and a data set
- Create and interpret graphs
- Conduct statistical analyses with software
- Design and test research hypotheses
- Interpret statistical methodology
- Interpret the results of statistical procedures

Texts

Required Text

Howell, D. C. (2002). *Statistical Methods for Psychology*, Fifth Edition. CA: Duxbury. (Sixth Edition may also be used).

Recommended Text

Vogt, W. P. (1999). *Dictionary of Statistics and Methodology: A Nontechnical Guide for The Social Sciences*, 2nd Edition. CA: Sage Publications, Inc.

Course Requirements

Homework

Most homework will come directly from the Howell textbook (so you need the current edition). Homework turned in one week late will be reduced a full letter grade.

Homework that is more than one week late **will not be accepted**. Any arrangements to turn in late work must be made *prior* to the due date.

Show all work on homework that you submit. Work must be neat and legible. Make sure that your final answer is clearly indicated (e.g., highlight or circle your **final** answer). Recopy HW problems if your “working copy” becomes too messy. Copies of the output should be provided with any work done on the computer.

I give small HW assignments that allow me to monitor the progress of individuals and the class. These assignments will not be sufficient practice for everyone. I encourage you to work additional problems as needed. Answers to odd numbered problems are included in the text.

Quizzes

The instructor reserves the right to administer unannounced quizzes at any time during the semester. If you are not present on a day that a quiz is administered, you will receive a zero on that quiz. Only students with prearranged absences will be given the opportunity to make-up a missed quiz. Quiz grades will be averaged into your HW grade.

Exams

Two exams will be given. These exams, the midterm and final, will not be cumulative. The midterm will be entirely in-class. The final will be take-home. Students will be responsible for all material covered during class lectures or in assigned readings. Prior to each exam, students will receive a summary of the content to be covered. There will be several opportunities to review the material before each exam. The UNCG Academic Integrity Policy will apply for all examinations.

Calculators, Computers, and Software

You will need a hand calculator during this course. You do not need anything fancy. Any standard scientific calculator (not a graphic calculator) should do.

We will use of the *Statistical Package for the Social Sciences* (SPSS). Purchasing the software or owning your own computer is not required. SPSS is available in most UNCG computer labs. The IRC website (<http://its.uncg.edu/Research/SPSS/>) has information on licensing a personal copy at an extraordinarily affordable rate. The “Base module” is sufficient for all analyses covered in this class.

Grading

Homework and quizzes make up $\frac{1}{3}$ of your course grade. The midterm and final exam are each worth $\frac{1}{3}$ of your course grade.

Home Work and Quizzes	100 pts (at least 10 will be given)
Midterm	100 pts
Final	100 pts

Grades will be assigned based on the following formula:

<u>Total Points</u>	<u>Grade</u>	<u>Total Points</u>	<u>Grade</u>
270-300	A	210-224	B-
255-269	A-	180-209	C
240-254	B+	000-179	F
225-239	B		

General Expectations

Your attendance at each lecture is expected. You are also expected to do the assigned reading *before* class. Reading in statistics textbooks can be dense. Give yourself ample time to read and think about the material.

You might find it useful to develop study groups. Working through difficult concepts with others is one of the best ways to develop a good understanding of statistics. To this end, I encourage you to work together on homework assignments (each student must still submit a full copy of her/his own work).

ASK QUESTIONS DURING CLASS. Be confident that if you do not understand a concept, at least one of your classmates needs clarification too. Help me do a better job of teaching by letting me know when I need to keep addressing a topic.

Topics and Readings

Week ¹	Subject	Chapter
8/15	Class Intro, Intro to Statistics, Displaying Data	1 - 2.6
8/22	Displaying Data, Central Tendency & Variability	2.7 - 2.13
8/29	The Normal Distribution	3
9/5	Sampling Distributions and Hypothesis Testing	4
9/12	Probability	5
9/19	Chi-Square	6
9/26	Probability/Chi-Square Overflow, Mid-Term Review	**
10/3	Midterm	**
10/10	No Class – Fall Break	**
10/17	Hypothesis Testing of Means	7.1 - 7.3, 7.6 (6 th 7.1 – 7.3)
10/24	Hypothesis Testing of Means	7.4 - 7.8
10/31	Power	8
11/7	Correlation	9.1 - 9.4, 9.10, 9.13
11/14	Regression	9.5 - 9.12
11/21	Alternative Correlation Techniques	10
11/28	Course Wrap-Up/Review, Exam Handed Out	**
12/8	Final Exam Due by 5:00pm	**

1. This schedule is subject to change. Some topics may take more time; others may take less. Further supplementary readings may be assigned throughout the semester. Any changes will be announced in class and posted on the web.