

Psychology 240: Statistics in Psychology

Summer session 2009: University of Massachusetts, Amherst

Overview: This course is designed to provide you with a conceptual understanding of data analysis in psychological research. Understanding the logic underlying techniques of data analysis is a core foundation of the course and will be necessary for applications of inferential statistics. Students will be expected to interpret statistics from various types of experimental designs, develop computer skills and learn SPSS, and understand the mathematical reasoning behind each test covered.

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Office Hours: T & Th 12:30 to 1:30, & By appointment

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What you will need for the class

Textbook

Moore, D.S. (2009). *The Basic Practice of Statistics*. (5th Ed). New York: W. H. Freeman and Company.

Calculator

You will want to own a basic calculator, as the arithmetic that is required on the homework assignments and on the exams may be tedious to do by hand. Some students have found statistical calculators or graphing calculators are useful, but these are certainly not required.

Access to SPSS

You will need to have access to SPSS, which we will be using for some of the homework problems, and especially for the labs. Most computers around campus have these programs.

Academic Honesty

All students are expected to adhere scrupulously to the University policy concerning academic honesty. For more information on the University's academic honesty policy, check this web site:

www.umass.edu/dean_students/codeofconduct/acadhonesty

Course Structure

The course is divided into two elements: lecture and lab.

Lecture

It is mandatory that you make every effort to attend lecture. It is your responsibility to get the lecture notes; lecture notes will not be provided by the instructor for missed classes. You will need to ask classmates for their lecture notes if necessary. You will find it most useful to do the assigned reading *before* the corresponding lecture. Keep in mind that absences from 1 day of lecture in a summer course are the equivalent of missing an entire week of lecture during a 14-week semester. Missing more than two classes will result in automatic failure of the course.

Lab

Lab will be held on Tuesdays. You will do two things in the lab. First, there will be a computer-based exercise each week. Second, we will go over key concepts from lecture, as well as homework problems.

Evaluation

Each day there will be a set of homework problems. You are allowed to discuss the problems with each other as much as you like, but each person's work should ultimately be his or her own. You may ask for assistance and you are also encouraged to visit office hours for help. I will also try to make time available in class to answer questions.

There will be three in-class exams over the course of the term. The problems on the midterms will probably be rather like some of the homework problems. Calculators will be encouraged. The final exam will be held on the last day of class.

Your final grade will be determined as follows:

Exam 1	(June 9)	100 points
Exam 2	(June 18)	100 points
Exam 3	(June 30)	100 points
Exam 4	(July 9)	100 points
Homework:		100 points
Total		500 points

Make-up exams will be given in extreme circumstances only and will be done within two class days that given exam is scheduled. Make-up exams will only be allowed if the student has a written medical or university-approved excuse, and presents this information prior to the exam. In the event of a medical emergency, students must inform the instructor as soon as possible and provide a doctor's note. Late homework assignments will only be accepted for the same reasons.

Homework Assignments: These must be **typed** or **neatly** handwritten. In other words, if you handwrite your homework, it should look like it is typed. This policy will be strictly enforced. Homework that is turned in and is handwritten but is not clear (e.g., poor handwriting or answers scratched out) will receive a zero. Homework should also have notebook edges torn off. There will be 10 homework assignments, but the lowest of these will be dropped. Thus, only your 9 best homework assignments will be counted toward your final grade. Each homework assignment will be worth 100 points, and each of the 10 that count toward your grade will be averaged for your final homework score. Late homework assignments will be docked 20 points per 24 hours late.

Grade Distributions

Grade:	Points Required:	Percent of Total
A	> 465	> 93%
A-	450 – 464	90-92.99%
B+	436 – 449	87-89.99%
B	415 – 435	83-86.99%
B-	400 – 414	80-82.99%
C+	385 – 399	77-79.99%
C	365 – 384	73-76.99%
C-	350 – 364	70-72.99%
D+	335 – 349	67-69.99%
D	300 – 334	60-66.99%
F	< 300	< 60%

Extra credit for participation in research will not be offered for this course.

Tentative Schedule:

Part I: Descriptive Statistics		
Tuesday June 2	Scientific uses of statistics; variables and measurement scales; Frequency distributions; percentiles	Read chapter 1
Wednesday June 3	Central tendency; characteristics of distributions; Variability; Sums of squares, variance, standard deviation	Read chapter 2 <i>Homework 1 Due</i>
Thursday June 4	z scores; correlation and covariance	Read chapter 3
Tuesday June 9	Exam 1	<i>Homework 2 Due</i>
Part II: Beginning Inferential Statistics		
Wednesday June 10	Continue with correlation; Using z scores; probability; the normal distribution	
Thursday June 11	Introduction to inferential statistics; sampling distributions; statistical hypothesis testing; decision errors	Read chapters 11 & 14 <i>Homework 3 Due</i>
Tuesday June 16	Confidence intervals; determining statistical significance; the p value;	<i>Homework 4 Due</i>
Wednesday June 17	Begin with the t distribution; one-sample t tests	Read chapter 17 <i>Homework 5 Due</i>
Thursday June 18	Exam 2	
Part III: Group Comparisons		
Tuesday June 23	paired sample t tests; Effect size: Cohen's d ; independent samples t test	Read chapter 18 <i>Homework 6 Due</i>
Wednesday June 24	ANOVA and the F ratio; comparisons among specific means	Read chapter 24 <i>Homework 7 Due</i>
Thursday June 25	Effect size: Eta-squared; Statistical power	<i>Homework 8 Due</i>

Part IV: Advanced Statistical Techniques

Tuesday June 30	Exam 3	
Wednesday July 1	2-way ANOVA; statistical interactions	Read chapter 28
Thursday July 2	Bivariate & Multiple regression	Read chapters 23 & 27 <i>Homework 9 Due</i>
Tuesday July 7	Categorical data: χ^2 tests and other nonparametric tests	Read chapter 22 <i>Homework 10 Due</i>
Wednesday July 8	Preview of advanced methods: moderated multiple regression; Factor analysis; SEM; HLM; review for final	
Thursday July 9		Final exam
