

Psychology 302 – Statistical Methods in Psychology

Summer 2009

Lecture: Monday through Thursday 10:00-10:50, 204 CHA

Friday Labs in 180 Straub: 1) 9:00-9:50; 2) 10:00-10:50

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Office Hours: tba

Straub Computer Lab rooms are open 8am-5pm Mon-Fri, closed weekends.

Blackboard site: Please check Blackboard (<http://blackboard.uoregon.edu/>) regularly (several times a week) for announcements, discussion, and materials such as lecture notes.

OVERVIEW OF COURSE STRUCTURE

Course Description: This course will introduce you to descriptive and inferential statistics, teach you how to calculate statistics and analyze data using a computer statistics package, and improve your ability to understand and evaluate the statistical information reported in primary research articles.

This class both is and is not really a math class. Although you will be learning how to do statistical calculations by hand, this course is very different from courses taught in mathematics departments. The focus in this class is on conceptual understanding of statistics. In the past, most students have found that the actual “number crunching” in this class is relatively easy. It is the conceptual understanding of statistical methods that is more difficult. Once you understand the concepts, you will probably have little trouble doing calculations. Tests will be focused on conceptual understanding, while homeworks will apply concepts to actual problems. Please keep this in mind as you approach this course.

Course Design: The course promotes active learning — through discussion, solving problems, and computer exercises. The instructors and TA are guides, cheerleaders, and coaches. The course encourages teamwork among students, instructor, and TA. *Although tests and quizzes are to be completed individually, students are encouraged to work together on homework.*

Responsibilities: If you complete this course, you will earn 4 credits toward your degree. It is important to reiterate that the requirements for this course are equivalent to those in the same course over 10 weeks during the regular academic year. By continuing in this course, you are accepting that the workload per week for this class is 1.25 times that of a 4-credit class during the regular academic year. According to University principles governing credit and contact hours, each credit is equivalent to 30 hours of work. Your 4 credits for this course are equivalent to 120 hours of work over 8 weeks, which is 15 hours per week. You will spend about 5 hours in class and lab each week and should expect to spend up to 10 hours engaged in reading, studying, and/or completing homework assignments outside of class each week.

COURSE REQUIREMENTS

Overview: You will be graded on homework and quizzes. Participation is also worth some points.

1. Participation. Participation includes in-class group activities. Participation points can only be gained from in-class exercises. Credit is based not at all on whether you got the right answer, but only on whether you tried.

2. Homework. Homework assignments are due **in lab on Friday** (at the **beginning** of your lab session) with the exception of homework #1 (due in class Thursday, July 2nd). Some problems will be completed “by hand” (includes calculators); some using SPSS; some with both methods. **Turn homework in on time! Late homework**, which is any assignment turned in after the beginning of your lab on Friday, earns *no* credit. You may drop your lowest homework score. If you miss a homework you will receive a 0 and that will count as your lowest score. However, you must complete all homework assignments (and turn them in on time) in order to earn 2% of your total course grade.

3. Quizzes are first thing every other Monday starting on July 6th. Be on time!! Quizzes will cover all material since the previous quiz. Quizzes are closed book, and are completed individually. Calculators are okay but probably unnecessary as quizzes will test your knowledge of conceptual material rather than your ability to perform calculations.

4. Books & Calculator. The required text is Gravetter & Wallnau, *Essentials of Statistics for the Behavioral Sciences*, 6th edition. Read assigned chapters **before** class and do Learning Checks as you encounter them. **Reread** if you have trouble with the Learning Check. The second time, you will understand more. You will also need a hand-held **calculator** that can do single variable statistics. No need for graphing calculators. **Bring a calculator & your text book to class.**

SPECIAL NEEDS

Students with Disabilities: If you have a documented disability and may need accommodations, contact me ASAP. Please let me know in advance even if you are not sure that your disability will require accommodation (for example, if you have a physical disability that may require you to miss class, but you aren't sure it will). Students who are experiencing learning difficulties are encouraged to consult Disabilities Services (164 Oregon Hall; 346-1155; <http://ds.uoregon.edu/>). Without documentation, accommodations are not guaranteed and are to be made at the discretion of the instructor.

Student Athletes: You must let me know during the first week of classes if you will miss class due to travel with a UO athletic team and request accommodation. Requirements for the course will not be relaxed for student athletes, however minor scheduling accommodations may be made (e.g., taking a quiz a few hours early) if planned well ahead of time.

Other Students: If you are repeating this class, or have other circumstances that might affect your ability to devote time to the class, please let me know now so we can discuss strategies to promote your success in this course. If you wait until you have problems in the course it may be too late to salvage your grade, but planning ahead will likely lead to success.

COLLABORATION

Collaborative Learning:

Discussing homework with other students and the TA is encouraged, as are homework and study groups for quizzes and exams. Talking over the problems and reworking them when you discover that others got different answers promotes deeper understanding of concepts. However, each student must submit a separate homework which was

written independently, and you must show your work (no photocopies or word-for-word copying). More explicitly, you may work together to solve problems and check your answers on homeworks with each other, but preparing those answers for your homework and the actual writing of **any** verbal answers need to be done independently.

Individual Work (when Collaboration = Cheating):

Your work on the **Quizzes** must be your own. Copying the work of others on these elements is cheating, and will earn you an F or N for the course. (The University may impose additional penalties in accordance with the student conduct code.) On the two exams, you may consult any materials that you have brought to the room, but you may not consult with others. Individual quizzes (closed book, closed notes), rely on your own memory and calculator only.

GRADING

Your *final course grade* is based on the following components:

- 48% Score on the 6 homework assignments (lowest score is dropped), each worth 8%
- 46% Score on 4 quizzes/exams, each worth 11.5%.
- 2% For turning in *all* homework assignments. These are “all or none” points, earned if you turn in all assignments, and not earned if you do not. They are an added incentive for completing all homeworks. *Note: you can only receive these points if all assignments are handed in on time.*
- 4% Participation in in-class exercises

Final grades will be based on percentage of total possible points earned, distributed as follows:

Course grades based on percentage of points			
	Percent		Percent
A	93-100	C-	70-72.9
A-	90-92.9	D+	67-69.9
B+	87-89.9	D	63-66.9
B	83-86.9	D-	60-62.9
B-	80-82.9	If taking Pass/Fail	
C+	77-79.9	N	< 70
C	73-76.9	P	70

What Do Students Need to Do to Succeed in This Class?

- 1. Read the assigned material.** That includes following the numeric examples closely and writing down questions about anything not entirely clear. *You are expected to read the text*, in full.
- 2. Complete the homework assignments (and turn them in on time).** Nearly all students who fail this course fail primarily because they either do not complete their homework assignments, or do not complete them on time. I do not know of a single student who has failed who has also turned in all completed homework assignments on time.
- 3. Attend the class sessions.** If you must miss a class, it is *your* responsibility to come to my office hours, or your TA's office hours, and find out what you've missed. Missing class, for whatever reason, does not entitle you to any special treatment or relaxed deadlines. *Do not fall behind!*
- 4. Attend your lab section.** Lab sections are not optional. In order to complete the homework problems, you will need to learn how to use the computer program SPSS, which will only be covered in lab. If you know you will have to miss a lab, let your TA know and try to attend a different lab section.

5. **Ask questions.** This is an *introduction* to statistical methods in psychology. You are not expected to know *anything* about this topic yet. Therefore, no question is a “dumb” question. If you don’t understand something, speak up! This is the only way I will know when I am not explaining something clearly. You can ask questions in class, by e-mail, and in office hours.
6. **Study for quizzes.** The quizzes will focus on your conceptual understanding of course material covered in lecture, labs, and readings. The best way to study for quizzes is to attend all classes/labs, complete all assignments, do all your reading, and ask questions when you don’t understand something. **Quizzes will cover different material from what is on HWs!**

TOP FIVE PITFALLS

1. *Passive listening and reading*

Write, draw, figure. Think with a pencil to learn. Turn the concepts into something you do. To succeed, you must be able to explain and execute.

2. *Spectator overconfidence*

Watching someone go through the steps is a starting point only. You have to get in the pool to learn how to swim.

3. *Beginner's luck*

Doing it right once doesn't mean you can repeat the trick. Get it wrong to understand how the process works. Mistakes help you learn.

4. *Trying to cram*

You can cram content, but skills don't compress. Don't fall behind; it's too hard to catch up.

5. *Giving up because you get stuck*

Everyone gets stuck. Try a new tack. ***Ask for help.*** Play around. Math is all about getting stuck and unstuck.

THREE WAYS TO DO WELL

1. *Keep up and keep trying*

Read assigned chapters early and often, come to lecture, start on homework immediately so you will finish on time. If you keep up and keep trying, the concepts will eventually sink in. Turn your homework in on time. Slog through those chapters even if you only understand half of what you read. The fog will clear if you just persist. Don’t give up!

2. *Work hard on understanding material in the first half of the course*

If you have a pretty good feel for the concepts in the first half, the second half will deepen your understanding. If you don’t grasp the concepts in the first half, the second half will make no sense. Seek help **early** when you are feeling lost.

3. *Stay in touch, and speak up*

Come to office hours. You have a dedicated instructor and TA, and we want to help! Ask questions--in class, in lab, in your responses, and in office hours. Forming a clear question helps you discover what you do and do not understand, which is vital to mastering this subject.

COURSE SCHEDULE

**Schedule and homework due date subject to change*

	Date	Topic	Readings	Quizzes/Assignments
Week 1 MP	6/22	Course introduction		
	6/23	Scales, frequency tables, histograms	Ch. 1-2	
	6/24	Central tendency	Ch. 3	
	6/25	Variability	Ch. 4	
	6/26	Lab 1		
Week 2 KL	6/29	z-scores	Ch. 5	
	6/30	Normal distribution	Ch. 6	
	7/01	Probability and the normal distribution	Ch. 7	
	7/02	The distribution of sample means		HW 1 Due
	7/03	NO SCHOOL		
Week 3 KL	7/06	Hypothesis testing	Ch. 8	Quiz 1
	7/07	Intro to the z-test		
	7/08	The z-test	Ch. 9	
	7/9	One-sample t-test		
	7/10	Lab 3		HW 2 due
Week 4 MP	7/13	Independent samples t-test	Ch. 10	
	7/14	Independent samples t-test		
	7/15	Related samples t-test	Ch. 11	
	7/16	Related samples t-test		
	7/17	Lab 4		HW 3 due
Week 5 MP	7/20	Intro to ANOVA	Ch. 13	Quiz 2
	7/21	One-way ANOVA		
	7/22	One-way ANOVA		
	7/23	Factorial ANOVA	Ch. 14 (392-417)	
	7/24	Lab 5		HW 4 due
Week 6 MP	7/27	Factorial ANOVA		
	7/28	Factorial ANOVA		
	7/29	Repeated-measures ANOVA	Ch. 14 (379-391)	
	7/30	Repeated-measures ANOVA		
	7/31	Lab 6		HW 5 due
Week 7	8/03	Correlation	Ch. 15 (423-449)	Quiz 3

KL	8/04	Correlation	
	8/05	Regression	Ch. 15 (449-467)
	8/06	Regression	
	8/07	Lab 7	HW 6 due
Week 8	8/10	Chi-square	Ch. 16
KL	8/11	Chi-square	
	8/12	Which test?, Review and recap	Pages 556-564
	8/13	Quiz(zes)	Quiz 4 & Makeup Quiz HW 7 Due

HOMEWORK ASSIGNMENTS

Put your name and your TA's name on all homework, and please staple. If unstapled, you must put your name on every sheet. All work must be neat and legible. If we can't read it we can't grade it!

Problems are at the end of each chapter. **Turn homework in on time!** To earn full credit, *show and explain all work*. For problems completed by hand, show all steps. **Annotate** SPSS output to receive full credit: Circle the most important numbers and explain (write or type directly and legibly on the output) what they mean. You must demonstrate that you are able to read and understand what you have produced. In addition, for any problem that includes hypothesis testing, you must include all steps of hypothesis testing including an APA style summary of your results. The book has answers to odd-numbered problems in the back. Use these for extra practice or to check your work.

Homework 1: Concepts, Scaling, Frequency Tables, Histograms, Central Tendency and Variability (15 pts).

- Ch 1: problems 2 (1.5 points), 4 (.5 point), 12 (1 point), and 18 (2 points)
- Ch 2, problem 18 (3.25 points): You may do chapter 2 problem 18 either using SPSS or by hand.
For part b of chapter 2 problem 18, sketch a histogram instead of a polygon. Label your axes, and include a title! If you use SPSS for this problem, be sure to include the output, clearly identify which parts of the output go with the homework question, and don't forget part c of the question.
- Ch 3, problems 8 (.75 point), 10 (1 point), and 26 (1.5 points). . For Ch. 3 problem 26 use SPSS (don't do #26 by hand).
- Ch 4, problems 9 (1.5 points) & 22 (2 points). Ch. 4 problem 22, complete the problem 3 times—once using the computational formula, once using the definitional formula, and once in SPSS.

Homework 2: z-scores, Probability, and the Normal Curve (15 pts).

- Ch. 5, problems 4 (2 points) & 22 (1 point)
- Ch 6, problems 4 (1 point), 8 (1 point), 12 (2 points), 16 (2 points)
- Ch 7, problems 12 (1.5 points), 20 (3 points), 24 (1.5 points). No SPSS homework this week.

Homework 3: z-test, one-sample t-test & Hypothesis testing (15 pts)

- Ch 8, problems 2, 6, 8, 16, & 19.
- Ch 9, problems 2, 10, & 24. Be sure to show all work and explain answers fully. For Ch. 9 problem 24, do the problem by hand and in SPSS. Use all steps of hypothesis testing and calculate Cohen's d when doing the problem by hand. For SPSS problems, annotate printout by circling the key elements in the output and explaining what the output shows.

Homework 4: t-tests with Independent Samples and Related Samples (15 pts)

- Ch 10, problems 2, 3, 4, 14a (by hand) and 21a (in SPSS). On 14a and 21a use all steps of hypothesis testing. For SPSS in problem 21a, annotate printout by circling the key elements in the output and explaining what the output shows.
- Ch 11, problems 2, 3, and 17 (both by hand and on SPSS). On 17 use all steps of hypothesis testing. For SPSS part of 17, annotate printout by circling the key elements in the output and explaining what the output shows.

Homework 5: One-way ANOVA (15 pts)

- *Ch 13*, problems 2, 3, 14, 15 (by hand and in SPSS), 22. For the by hand version of problem 15 use all steps of hypothesis testing and compute eta-squared. In the SPSS version, do both Scheffé and Tukey post-hoc tests. Annotate output, including explaining results (what did you find?).

Homework 6: Advanced ANOVA (15 pts)

- *Ch 14*, problems 1, 12, 21, 24, and 28 (by hand and in SPSS). For the by hand version of problem 28 use all steps of hypothesis testing. In the SPSS version, annotate output.

Homework 7: Correlation, Regression & Chi-Square (15 pts)

- *Ch 15*, problems 4, 8 (by hand and in SPSS), 18, and 22. For the by hand version of problem 8, use all steps of hypothesis testing. For the SPSS version of problem 8, after finding the correlation for the data in the book (*EXTRA STEP*), change the correlation substantially by adding an outlier (make up the data for this person). Hand in annotated printouts for both original and modified data sets (identify which is which, and write down the data for the outlier you added), including an explanation of results. Explain on the modified printout what you learned from the exercise about the possible impact of a single case on correlation.
- *Ch. 16*, problem 18. Do all problems by hand, and in SPSS. For by hand version use all steps of hypothesis testing. For SPSS versions, annotate output.