

**Psychology 302: STATISTICAL METHODS**

229 McKenzie, TTH 16:00-17:20 (4-5:20 pm)

Labs: Wednesdays 12-1:20, 2-3:20, 4-5:20, 180 Straub Hall

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**Text:** Gravetter, F. J., & Wallnau, L. B. (2005). Essentials of statistics for the behavioral sciences. Belmont, CA: Thomson/Wadsworth.

**Course web page:** Blackboard

**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.** While 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. **Quizzes will be focused mainly on conceptual understanding, while homeworks will apply concepts to actual problems. The final exam will include both conceptual understanding and calculations.** Please keep this in mind as you approach this course.

**Requirements**

1. Sufficient participation credit is gained from in-class exercises, which you will turn in during class. Credit is based not at all on whether you got the right answer, but only on whether you tried. If you attend every class and do the exercises, you will get full credit.
2. Homework will be assigned each week on Monday, and will be due **in class** the following Monday. Your lowest homework score will be replaced with your highest homework score. If you miss a homework you will receive a 0 and that will count as your lowest score. **No late homeworks will be accepted for credit.** However, even if you fail to get a problem set in on time, you are required to turn in all homework assignments **by the last class session** in order to get 5% of the course grade. This 5% of the course grade is awarded on an all or none basis. If you turn in all your assignments (even if they are turned in late) you get the 5%, if you are missing even just one, you don't get any of the credit.
3. Quizzes/Final Exam Two quizzes will take place throughout the term. The quizzes will consist of multiple choice questions, **and will be primarily conceptual**. This means that **quizzes and homeworks will cover different material**. The second quiz will *focus* on material presented since the previous quiz, but will require knowledge from throughout the course (because all of the material in the course is cumulative, the quizzes will also be cumulative). The quizzes are closed book, but you may use a calculator and the instructor will provide any necessary formulas on the quiz, however on most quizzes you will not be required to do calculations. At the end of the term, there will be a cumulative

final exam which will consist of **BOTH** conceptual questions and applied questions (similar to homework problems). If you must miss a quiz, talk to the instructor, as it may be possible (e.g., with a signed medical excuse) to arrange a make-up quiz (different version than the one given earlier in class).

4. Extra Credit You may complete one hour of research credit for 1% extra credit. In order to sign-up for research credits you need to register with the sona system: <http://uopsych.sona-systems.com/>

### **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 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.
5. **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!**

### **Grading**

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

45% Score on the 9 homework assignments, each worth 5%

45% Score on 2 quizzes/1 final exam, each worth 15%.

5% For turning in *all* homework assignments. These are "all or none" points, received if you turn in all assignments, not received if you do not. They are an added incentive for completing all homeworks. *Note: you can receive these points even if some assignments are handed in late, as long as all assignments are eventually handed in.*

5% Sufficient participation in in-class exercises

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

A+	98-100		C	73-76.9
A	93-97		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		P*	70 or higher
C+	77-79.9		N*	less than 70

*\*If taking Pass/Fail*

## **Rules and Policies**

No late homeworks will be accepted. It is your responsibility to stay on top of things, plan ahead, and leave some wiggle room in case an unexpected emergency comes up. Makeup quizzes will be given on a case by case basis if there is a medical excuse or a death in the family. There will not be a make-up final exam.

Collaborative learning is encouraged: If you want to discuss the problems with other students, feel free to do so. Talking over the problems and reworking them when you discover that others got different answers promotes deeper understanding of concepts and gives you more practice in applying skills. However, *each student must submit separate homework*, and you must show your work (no photocopies or word-for-word copying). This is also the case for SPSS problems—you may work together to get the SPSS output, but then each person must interpret and annotate the output individually.

The TAs and the instructor take academic integrity seriously. **Cheating** is defined as providing or accepting information on a quiz or exam, plagiarism or copying anyone's written work, or allowing someone else to copy your work. In addition, lying to try to get points (e.g., lying about having turned in an assignment on time) is considered academic dishonesty and will be treated as cheating. Students caught cheating will be given an "F" for the course, and UO's student conduct coordinator will be informed. The instructor retains the right to assign seats for tests, to change an individual's seating for test security purposes, to require and check ID for admission to tests.

## **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). With advance planning, adjustments can be made. Last minute changes are problematic.

**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 require accommodation, to allow the instructor and TAs to plan accordingly.

**Other Students:** If you are repeating this class, or if you are a student with children, a job, 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.

## **CLASS SCHEDULE**

*Note: This is an outline for the course, subject to change at any time. Updates to this schedule will be discussed in class, so please attend.*

<b>Date</b>	<b>Topic</b>	<b>Readings</b>	<b>Quizzes/Assignments</b>
4/03	Course Introduction		
4/05	Scaling, Frequency Tables, Histograms	Ch. 1-2	
4/10	Central Tendency and Variability	Ch. 3-4	HW 1 Due
4/12	Z-Scores and the Normal Distribution	Ch. 5	
4/17	Probability and the Normal Distribution	Ch. 6	HW 2 Due
4/19	QUIZ 1		
4/24	The Distribution of Sample Means	Ch. 7	HW 3 Due
4/26	Hypothesis Testing with z and t	Ch. 8 & 9	
5/01	More about t: Independent vs. Related	Ch. 10 & 11	HW 4 Due
5/03	Finish t/Review types of t-tests		
5/08	Analysis of Variance	Ch. 13	HW 5 Due
5/10	More ANOVA/review		
5/15	QUIZ 2		HW 6 Due
5/17	Advanced ANOVA	Ch. 14	
5/22	Correlation	Ch. 15	HW 7 Due
5/24	Regression		
5/29	Chi-Square		HW 8 Due
5/31	Chi-Square	Ch. 16	
6/05	Which Test? What to use when	Appendix D	HW 9 Due
6/07	More Which Test?, Review and Recap		
6/11 @ 1:00pm	FINAL EXAM		

## **HOMEWORK ASSIGNMENTS**

*\*Put your name and your TA's name on all homework.*

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. 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 and Histograms (15 pts)**

Ch 1 (p. 27): problems 5, 8, 12 & 19; Ch 2, problem 8. You may do problem 8 either using SPSS or by hand. Label your axes! If you use SPSS for problem 8, 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.

*Points:* Problems 5, 8, 12: 2 pts each; problem 19, 4 pts, Ch. 2 problem 8, 5 pts.

### **Homework 2: Central Tendency & Variability (15 pts)**

Ch 3, problems 8 & 10. Ch 4, problem #14 (by hand, using the computational formula) & Ch. 4, #16. You will do #16 a total of three times. Do it **first** by hand, showing all steps and using definitional formula (step 1) and then **again** using SPSS (use SPSS to find the mean, sample variance, and standard deviation for the data - step 2). NOTE: SPSS will automatically treat the data as a \*sample,\* not a population. Finally, do it **again** using SPSS, but change the numbers around until you have a data set with the SAME mean and n, but twice the sample variance as the original data set (use trial and error method!). Include output from SPSS showing the mean, variance, & sd for original and altered data sets, annotate to clarify which parts of the printout go with steps 2 & 3, and include the numbers in the altered data set you created for step 3.

*Points:* Ch 3, 8&10, 2 pts, Ch 4, #14, 4 pts; #16 (by hand, SPSS, extra step): 7 pts.

### **Homework 3: z-Scores & the Normal Curve (15 pts)**

Ch 5, problems 2, 6, 14, 22. *\*\*For question 22, be sure to explain your answer.\*\** Ch 6, problems 8ab, 10ac, 13cd. No SPSS homework this week.

*Points:* Problem 6 worth 3 pts; Other problems worth 2 pts each.

### **Homework 4: Distribution of Sample Means & z-test (15 pts)**

Ch 7, problems 13 & 20, 26. Ch 8, problems 6 & 8. Be sure to show all work and explain answers fully. No SPSS homework this week.

*Points:* Chapter 7 problem 20 worth 4 pts., Chapter 8 problem 8 worth 5 pts., Other problems worth 2 pts each.

### **Homework 5: t-Tests with Independent Samples and Related Samples (15 pts)**

Ch 9 problem 6, Ch 10, problems 8ab & 22a. Ch 11, problems 4 & 22. Do Ch 10 problem 22a & Ch 11 problem 22 *both by hand and on SPSS*. On the “by hand” versions, state the research question, follow step-by-step method and number steps, and end with answer to research question. Annotate printout by circling the key elements in the output and explaining what the output shows. Include APA summaries when you do hypothesis tests.

*Points:* ch 9 #6 worth 3 pts. Ch 10 #8 & Ch 11 #4, 2 pts each. Ch 10 #22 & Ch 11 # 22, 4 pts each.

### **Homework 6: ANOVA (15 pts)**

Ch 13, problems 4, 18 & 24. Do the ANOVA for Ch. 13 problem #24 *both by hand and using SPSS* (note: treat the birth variable as a fixed effect). For by hand version, state research question, follow and show all calculations and hypothesis testing steps, and also create an ANOVA summary table. In SPSS version, do both Scheffé and Tukey post-hoc tests. Annotate output, including explaining results (what did you find?) in APA format.

*Points:* Problem #4, 2 pts, #18, 4 pts; #24, 9 pts.

### **Homework 7: Advanced ANOVA (15 pts)**

Ch 14, problems 18, 20c (by hand) & 24 (SPSS). Do #24 ANOVA using SPSS (not by hand). Request a plot for help in interpreting the interaction. Annotate output, including an explanation of your results in APA format.

*Points:* Ch 14 #18, 3 pts, #20c & # 24, 6 pts each.

### **Homework 8: Correlation & Regression (15 pts)**

Ch 15, problems 2, 6ade (by hand), 9 (using SPSS), 14, 24 (by hand). For problem 9, 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 in APA format. Explain on the modified printout what you learned from the exercise about the possible impact of a single case on correlation.

*Points:* Problems #6 & #9, 5 pts each; #2 & #14, 1 pt each, #24, 3 pts.

### **Homework 9: Chi-Square (15 pts)**

Ch 16, problems 4, 8, & 20. Do all chi-square problems by hand, showing all work and going step by step, and explaining the answer to the research question at the end. In addition, do problem 20 using SPSS (be sure to request EXPECTED as well as OBSERVED counts). Annotate printout and include an APA summary.

*Points:* Ch 16: 4 pts each for 4, 8, 20 by hand, 3 pts for #20 SPSS

