

Psychology 302: STATISTICAL METHODS

146 Straub Hall, MW 14:00-15:20 (Mondays & Wednesdays, 2-3:20 pm)

Labs: Mondays 4-5:20pm, Tuesdays 8:30-9:50am, 12-1:20pm, and 2-3:20pm, 180 Straub Hall

Instructor: Mark Reid – mreid1@uoregon.edu

Office: 202 Straub

Office Hours: W 12-2pm

Course web page: Blackboard

Text: Gravetter, F. J., & Wallnau, L. B. (2007).

Essentials of statistics for the behavioral sciences
(6th edition). Belmont, CA: Thomson/Wadsworth.

Teaching Assistants:

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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 (SPSS), and improve your ability to understand and evaluate the statistical information reported in primary research articles. Although the material covered applies to many sciences, this class is most useful for psychology majors, as many examples and problems will come from psychological research. While you will be learning how to do statistical calculations, this course is very different from those taught in mathematics departments. The focus of this class is on **conceptual understanding of statistics**, rather than mathematical procedures and formulas. In the past, most students have found that the actual “number crunching” in this class is relatively easy, while the conceptual understanding of statistical methods is more difficult. **Quizzes will focus on conceptual understanding, while homeworks will apply concepts to actual problems** (more calculations by hand and in SPSS). Please keep this in mind as you approach this course.

Requirements

1. **Participation** credit is gained from in-class exercises, which you will turn in during class. Credit is based on whether you tried, not on whether you got an answer right. If you attend every class and do the exercises, you will get full credit. In-class exercises will not occur on a fixed schedule and will not be part of every class, so attending every class is the only way to get full credit.
2. **Homework** assignments are listed at the end of this syllabus. They will be discussed in lab each week (Monday/Tuesday, starting week 2), and will usually be **due by the beginning of lab the following week** (see exceptions listed in *Class Schedule*). **No late homeworks will be accepted for credit.** However, even if you fail to turn in a problem set on-time, you are required to turn in all homework assignments **by the scheduled time of the final** in order to get 5% of the course grade and earn one homework score replacement (drop your lowest homework score and replace it with your highest homework score). A missed homework assignment will count as a 0, but you must turn it in eventually to replace this low score and earn 5% of the course grade. If you turn in all of your assignments (even late, but before the March 15th deadline) you earn the full 5%. If you are missing one or more, you do not get any of the credit and you will not be able to replace your lowest score.
3. **Quizzes** will take place on 1 Monday and 4 Wednesdays throughout the term. A short lecture will follow all quizzes, except on March 10th. The quizzes will consist of 20 multiple choice questions, **and will be primarily conceptual**, meaning that **quizzes and homeworks will cover different material**. All quizzes will *focus* on material presented since the previous quiz, but will require knowledge from throughout the course (making the quizzes cumulative). The quizzes are closed book, though formulas will be provided for simple calculations. At the end of the term, you will have the option of taking a “make-up” quiz, which will replace the lowest of your 5 quiz scores. Therefore, if you miss a quiz (and have a score of 0 for that quiz) the makeup quiz can be used to replace that. **This is the only option for making up missed quizzes – no exceptions*!**

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!**

Grading

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

44% Scores on the **8 homework assignments**, each worth 5.5%**

45% Scores on **5 quizzes**, each worth 9%**

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 handed in by the scheduled day of the final.*

6% **Participation** in in-class exercises

**Note: Random Extra Credit assignments will pop up on occasion. These points can only be applied to scores within a particular assignment type, up to a score of 100% for that assignment type (i.e. homework extra credit points apply only to homework grades until you have all perfect homework grades; extra quiz points apply only to quizzes until you have perfect quiz scores).

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

A+	<i>Reserved for exceptional performance</i>		
A	93-100	D+	67-69.9
A-	90-92.9	D	63-66.9
B+	87-89.9	D-	60-62.9
B	83-86.9		
B-	80-82.9	N	less than 70***
C+	77-79.9	P	70 or higher***
C	73-76.9		
C-	70-72.9		***If taking pass/fail

Rules and Policies

No late homeworks will be accepted. No makeup quizzes will be given, other than the one final make-up quiz at the end of the term. It is your responsibility to stay on top of things, plan ahead, and leave some wiggle room in case an unexpected emergency comes up. You have the option of dropping **one** homework score (if submitted late) and replacing **one** quiz score with the makeup quiz. If unexpected circumstances come up that cause you to miss more than one homework assignment and more than one quiz, it is suggested that you talk to me to determine the best course of action (i.e., withdrawing and retaking class versus being graded on current performance). **No exceptions will be made to this policy***. **Except if something catastrophic occurs – please see me!*

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 homeworks**, 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. Violation of this policy will constitute cheating, and will impact your grade!

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.

A note on A+ grades: A+ grades are reserved for outstanding or exceptional performance that **stands out** from the rest of the class, and will be given to a *maximum* of 1-2 students in a class this size. For your own sanity—please do not “go for” an A+; it is not worth it. Also, recently most graduate schools have adopted a policy of requiring applicants to recalculate their GPA's without A+ grades included, meaning A+ grades usually carry the same weight as good old regular A grades.

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. 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 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

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. Being unaware of a change due to missing class is not an excuse for being unprepared.

Date	Topic	Readings	Quizzes/Assignments
1/4	Course Introduction		
1/4-5	No Lab this week!		
1/6	Variables: Scale, Frequency, Histograms	Ch. 1-2	
1/11	Distributions & Variance	Ch. 3-4	
1/11-12	Lab 1 - Intro to Variables, Variability		
1/13	Z-Scores and the Normal Distribution	Ch. 5	Quiz 1 (Ch 1-4)
1/18	No Class! – Martin Luther King Jr. Day		
1/19	No Lab this week!		
1/20	Probability and the Normal Distribution	Ch. 6	HW 1 Due in class
1/25	Distribution of Sample Means, CLT	Ch. 7	
1/25-26	Lab 2 - Z-scores and Probability		
1/27	Hypothesis Testing with Z	Ch. 8	
2/1	Hypothesis Testing with T	Ch. 9	Quiz 2 (Ch 5-8)
2/1-2	Lab 3 - CLT, Hypothesis Testing		HW 2 Due in lab
2/3	t-Tests: 1 or 2 Independent Samples	Ch. 10	
2/8	t-Tests: Independent, Related	Ch. 11	
2/8-9	Lab 4 - Independent and Related t-Tests		HW 3 Due in lab
2/10	Intro to ANOVA	Ch. 13	Quiz 3 (Ch 9-11)
2/15	More ANOVA	"	
2/15-16	Lab 5 - One-way ANOVA		HW 4 Due in lab
2/17	Factorial ANOVA	Ch. 14	
2/22	More Factorial, RM ANOVA	"	
2/22-23	Lab 6 - Factorial ANOVA		HW 5 Due in lab
2/24	Correlation	Ch. 15	Quiz 4 (Ch 13, 14)
3/1	Regression	"	
3/1-2	Lab 7 - Correlation and Regression		HW 6 Due in lab
3/3	Chi Square	Ch. 16	
3/8	More Chi Square, "Which Test?" Review	pp 556-564	
3/8-9	Lab 8 - Chi-Square		HW 7 Due in lab
3/10	Quiz 5, Make-up Quiz		Quiz 5 (Ch 15, 16, Which Test?) and Make-up Quiz
3/15	HW 8 and Late HW Due by 4PM @ Psychology Main Office (Straub 131)		HW 8 and all Late HW Due at Psych Main Office

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. 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 (15 pts)

Ch 1: problems 4, 13, 17 & 19

Ch 2: problems 11 & 18_{bc}

Ch 3: problems 8 & 10. You may do problem 11 **either** using SPSS **or** by hand. Label your axes! If you use SPSS for problem 11, be sure to include the output, clearly identify which parts of the output go with the homework question. For question 18, you only need to do parts B and C.

Points: Ch 2: #11 - 3 pts, Ch 3: #8 & #10 - 1 pt each; All others - 2 pts each.

Homework 2: Variability, z-Scores, & the Normal Curve (15 pts)

Ch 4: problems 20_{ac} (by hand), 22 (using SPSS) & 24 (by hand). For Part C of problem 20, use the definitional formula, and do not worry about the estimate question; For problem 24 use the computational formula.

Ch 5: problems 2, 4_{ab}, 22 (for question 22, be sure to **explain** your answer);

Ch 6, problems 8_{ac}, 10_{ad}, 11_{cd}.

Extra Credit: Go back to Chapter 4, Problem 20. 1) Use SPSS to find the mean, sample variance, and standard deviation for the original data. 2) The answers you obtain will differ from the by-hand calculations. Ask your TA why this is and write down the answer. 3) Again using SPSS, change the original numbers from the problem around until you have a data set with the SAME mean and n, but twice the sample variance compared to what you obtained in Part 1 (use trial and error method, and the definition of variance to help you!). 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 1 & 3, and include the numbers in the altered data set you created for step 3.

Points: Ch 4: #20_{ac}, #24; Ch 5: #4_{ab} - 3 pts; All others - 1 pt each; Extra Credit: 4 pts.

Homework 3: Distribution of Sample Means, z-test & t-test (15 pts)

Ch 7: problems 14 & 24;

Ch 8: problems 6 & 8

Ch 9, problem 8. Be sure to show all work and explain answers fully. Include an APA-style summary of your results for Ch 8 problem 8. For Ch 9 problem 8, please show all work, though hypothesis testing steps are not needed. In Ch 9 problem 8, the phrases "4-point effect" and "8-point effect" are redundant, reflecting the obtained mean values for each part. The question is asking you to compute two *t* tests, one for each mean value, where the top half of the calculation equals the "4/8 point effect." No SPSS homework this week.

Points: Ch 8: #8 - 5 pts; Ch 9: #6 - 4 pts; All others - 2 pts each.

Homework 4: t-Tests with Independent Samples & Related Samples (15 pts)

Ch 10: problems 9ab & 23a

Ch 11: problems 4 & 23. Do Ch 10 problem 23a & Ch 11 problem 23 both by hand and on SPSS.

On the by-hand versions, state the research question, follow step-by-step hypothesis-testing method, and end with answer to research question; also, *show all work!* For the SPSS version, annotate printout by circling the key elements in the output and explaining what the output shows. Finish both problems with one APA style summary (using info from SPSS printout).

Points: Ch 10 #9ab & Ch 11 #4 - 2 pts each; Ch 10 #23a & Ch 11 #23 - 5.5 pts each.

Homework 5: ANOVA (15 pts)

Ch 13: problems 4, 20 & 25. Do Ch 13 problem 25 both by hand and using SPSS (note: treat the birth/siblings variable as a “fixed” effect). On the by-hand version, state research question, follow and show all calculations and hypothesis testing steps, and also create an ANOVA summary table of your calculations. In SPSS version, obtain descriptive stats for all groups, and do a Tukey post-hoc test. Annotate all output, including brief explanations of results (i.e., describe significant results in a few words). Include an APA-style summary of results, using info from SPSS.

Points: Ch 13: #4 - 2 pts; #20 - 4 pts; #25 - 9 pts.

Homework 6: Advanced ANOVA (15 pts)

Ch 14: problems 20, 26 (by hand) & 28 (SPSS). For problem 26, show all work, and include **all** hypothesis testing steps, a source table, and an APA-style summary. For problem 28, you do not need to include all steps of hypothesis testing, but you do need to request a plot for help in interpreting the interaction. Also for problem 28, annotate all output to explain your results, and include both an APA-style summary and APA-style means table (with means and SDs).

Extra Credit: Ch 14, problem 24 (by hand)

Points: Ch 14: #20 - 3 pts; #26 & #28 - 6 pts each; Extra Credit: 3 pts.

Homework 7: Correlation & Regression (15 pts)

Ch 15: problems 1, 2, 7 (by hand), 8 (using SPSS, also complete the Extra STEP), 10ab, 22ab (by hand). Show all work for by-hand problems. **Extra STEP for problem 8:** after finding the correlation for the data in the book, change the correlation substantially by adding an outlier (make up the data for this couple). 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 (APA-style summary). Also explain on the modified printout what you learned from the exercise about the possible impact of a single case on correlation.

Points: Ch 15: #1 & #2 - 0.5 pts each; #7 & #8 - 5 pts each; #10ab - 1 pts; #22ab - 3 pts.

Homework 8: Chi-Square (15 pts)

Ch 16: problems 6 (by hand), 10 (by hand), & 20 (by hand and SPSS). Show all work and include all hypothesis testing steps. Answer the research question at the end of each problem in an APA-style summary. In addition, do problem 20 using SPSS (be sure to request EXPECTED as well as OBSERVED counts). Annotate printout.

Points: Ch 16: #6, #10, & #20 (by hand) - 4 pts each; #20 (SPSS) - 3 pts.