

Statistical Methods in Psychology – PSY 302 / Spring 2016 / CRN 35177

Lecture Tuesday/Thursday 12:00-1:20 in 240A MCK (McKenzie Hall)
All labs are in 006 or 008 STB (Straub Hall) Wednesdays at scheduled times
Course Webpage available at: <https://canvas.uoregon.edu>

Dr. Sean Laurent

Email: slaurent@uoregon.edu
Office Hours Location: 437 Straub Hall
Hours: Tuesdays/Thursdays 11:10-11:50 & 1:30-1:50 (and by appt.)

Graduate Teaching Assistants

Robbie Ross

Email: robbier@uoregon.edu
Office Hours Location: 432 Straub Hall
Hours: Fridays 10-Noon & by appt.

Jason Wallin

Email: jwallin@uoregon.edu
Office Hours Location: 432 Straub Hall
Hours: Thursdays 10-Noon & by appt.

Required Materials

Aplia: This is an online program you will use to complete homework assignments.

Text: Gravetter, F. J., & Wallnau, L. B. (2013). *Essentials of statistics for the behavioral sciences* (8th edition). Belmont, CA: Thomson/Wadsworth. **This text is bundled with Aplia as an e-book. Hard copy is not required.**

iClicker: If you do not own one already, you will need to purchase an iClicker for use in class. It will be used to track attendance, and to do regular learning assessments.

You will also need a **calculator** for in-class work. It does NOT need to be a graphing calculator. Please bring it to class.

Course Description and Goals

Welcome to Statistical Methods! This course will introduce you to basic 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 statistical information reported in primary research articles, newspapers, and magazines. As a bonus, you will sharpen your ability to think critically and logically about important topics. These skills will provide you with a basic foundation in statistical/mathematical elements of scientific methodology, needed if you choose to go on to graduate study in the social, behavioral, or physical sciences, but useful even if you do not.

By the end of this course, you should be able to read a description of a research study and identify the appropriate statistical technique needed to answer the research question. Using hypothesis-testing procedures, you should be able to conduct this test (by hand or using statistical software), draw conclusions, and write up the results in APA style based on your analyses.

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 will be on increasing your **conceptual understanding** of statistics. In the past, most students have found that the “number crunching” in this class is relatively easy; it is the conceptual understanding of statistical methods that can be difficult for some. Once you understand the concepts, you will probably have little trouble doing calculations. **Exams will be focused on conceptual understanding, while homework assignments will apply concepts to actual problems.** Please keep this in mind as you approach this course.

Course Design and Responsibilities

The course promotes active learning through discussion, problem solving, and computer exercises. In many ways I and your TAs are like coaches, but ultimately, it is YOU who must work to learn the concepts and demonstrate your learning. Be aware that it is OUR goal to help you achieve this. We sincerely want all students to succeed.

When you complete this course, you will earn 4 credits toward your degree. According to University principles governing credit and contact hours, each credit equals 30 hours of work for the term. Four credits are thus equivalent to 120 hours of work in total, or 12 hours per week for 10 weeks. You will spend 4 hours in class and lab each week. The other 8 hours should be spent reading, studying, and completing assignments outside of class.

Course Philosophy and Expectations

The course includes traditional lecture meetings and weekly lab meetings. Attendance at all lectures and labs is **mandatory** and *essential* to your success in this course. Attendance will be tracked using iClickers in lecture. When in class, you should stay engaged with the material rather than just going through the motions. Ask questions. Take notes. Go to office hours.

If you find yourself not doing as well as you would like in this class, you should contact us earlier rather than later. Although you must take responsibility for your own learning, we can also help you solve many problems, if they arise. But if you wait until the end of the term, it will probably be too late for us to be of much help.

Come **prepared** to class. Read relevant assignments prior to class, think about what you read, and bring questions if you have them. You will not do well on exams if you do not keep up with the reading. You should also do the *learning checks*, and if you find you haven't completed them successfully, read through the material again. It will help you improve your understanding.

Check your email and the Canvas website often, as we may post important class information. This course has been designed to comply with the psychology department's guidelines for teaching and learning (also appended at the end of this syllabus <http://psychweb.uoregon.edu/undergraduates/guidelines>).

Course Requirements

1. Attendance/participation: You must participate in *ungraded* class exercises using your iClicker to get credit for each day you attend. While you get 3 "free" miss days, you shouldn't use them unless absolutely necessary; if you skip class or lab, you will miss important information. The question "Did I miss anything important?" is always answered with "Of course."

Important Note on iClicker: You are required to have an iClicker *by the end of Week 2*, or you will begin to lose attendance points. You must also register your iClicker on Bb *by the start of Week 3*. If not registered *by the start of Week 5*, you will be unable to earn **any* participation points*.

2. Homework: Assignments are due each **Friday at 6 pm, electronically**.

Homework has two components:

Aplia software questions. **After the due date and time, these assignments become unavailable. Therefore, Aplia HW cannot be turned in late.** If you do not register Aplia by the final date, you will lose all Aplia points!!

Make sure to register with Aplia using your UO email address!!

You get up to three attempts to answer questions correctly. However, with multiple attempts, your score will be the *average* of all attempts. So it is in your best interest to try hard and do the best you can the first time!

Complete the SPSS portion of the homework as an electronic document. Download this from Canvas (see "Assignments"), copy and paste *relevant* SPSS output in the document, and upload back to Canvas.

For help, see <https://blogs.uoregon.edu/canvas/support/> or ask your lab instructor.

SPSS assignments will lose 10% of points in every 24 hour period they are late, including weekend days, starting at 6:00 *sharp* on Fridays. **Aplia assignments cannot be late; see above.**

3. Quizzes: There will be 5 in-class quizzes throughout the term (in weeks 3, 4, 6, 8, & 10). Quizzes will be multiple-choice, and will cover all material since the previous quiz. Your lowest quiz grade will be *dropped*. I use this policy so that poor performance on one quiz or an absence for a quiz does not negatively impact your class grade. Because of this, **I do not allow make-up quizzes**. If, for *whatever reason* (aside from university sponsored excuses), you miss a quiz, this will be the one that is dropped. *Missing subsequent quizzes will result in grades of zero for those quizzes.*

Quizzes will begin promptly at the start of class, and you will have 40 minutes to complete them. If you finish early, you may (temporarily) leave class, or sit quietly. All quizzes and materials must be turned in. **Lecture will start following the quizzes, and attendance will be taken at some point during lecture.**

4. Final Exam. The final exam will be cumulative. Approximately ½ of the final will cover selecting the appropriate statistical test to answer a given research question. Knowing when to use which statistical test (i.e., how to appropriately analyze your data) is one of the fundamental goals of this course. The other ½ will be similar to quizzes.

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 will be problematic. Students who are experiencing learning difficulties are encouraged to consult the Accessible Education Center (164 Oregon Hall; 346-1155; <http://aec.uoregon.edu/>). Without documentation, accommodations are made at discretion of 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 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.

Collaboration

We strongly encourage collaborative learning, but you must produce (and we must assess) individual work. Discussing homework with other students and instructors is encouraged, as are homework and study groups. Talking over problems and reworking them when you get different answers promotes deeper understanding of concepts. However, each student must submit individual homework assignments (i.e., *written independently with no word-for-word copying*). You also must show your work for hand calculations. Thus, while we encourage you to work together to solve problems and check answers, the actual writing of answers needs to be done independently.

Academic Integrity

We take academic integrity seriously. **Cheating** is defined as providing or accepting information on an 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. Discovery that a student has cheated will lead to a grade of F in the course for that student, and we will inform UO's student conduct coordinator. We retain 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. Simply put: Don't cheat, as it will make everyone upset. You will be mad at me, and (hopefully) disappointed in yourself. It's not worth it, and it doesn't really work anyway.

How to Succeed in this Class!

Keep up, and don't give up! Read assigned chapters early and often. Keep reading even if you do not understand everything you read. Persist, and re-read. Follow numeric examples closely and write down questions if you have them. The material will become clear as time goes along. Be aware that many of us (including me) have somehow managed to learn this material. However, be aware that success will not come from simply taking the class. For most people (again, including me), learning statistics requires hard work. There is no "secret" – you simply must put in the effort. **I have yet to see a student fail who sincerely tried hard to succeed.**

Show up! Come to each and every class and lab. Actively engage with the content. If you miss a class, it is your responsibility to catch up on the material. Be aware that lab sections are not optional. To complete homework assignments, you have to learn to use SPSS, and this content will be covered only in lab. If you have to miss a lab, try to make arrangements with your TA to go to a different section (however, unless you have made arrangements, you must attend your scheduled lab). You should also *go to office hours!* We hold these hours for YOU. Office hours give you an opportunity to increase the depth of your understanding, go over lingering issues, and get answers. **I have never seen a student fail who came to all classes and labs, and attended actively rather than just going through the motions.**

Complete homework assignments, on time! *Nearly all students who fail this course do so primarily because they either do not complete their homework assignments, or do not complete them on time.* **Aplia assignments cannot be turned in late. SPSS assignments lose 10% in each 24 hour period following their due date/time.**

Ask questions! This is an *introduction* to statistical methods in psychology. I don't expect you to know the first thing about statistics when you enter this class. Thus, there truly are no "dumb" questions. Forming a clear question helps you discover what you do and do not understand, which is vital to mastering this subject. If you don't understand something, you can be sure that about ½ the class does not understand. If you have a question, assume ½ the class has a similar question. You must speak up! I am not infallible. This is the only way I will know when I am not explaining something clearly. Remember, we all want you to succeed. Help US help YOU!

Study! While facts can be crammed, conceptual understanding cannot! Learning happens best when it is *distributed over time*. Skim chapters, and then re-read them closely. Do a little work every day. Exams will focus on your conceptual understanding of course material covered in lecture, labs, and readings. Note: Make doubly sure you understand early material. If you get the concepts in the first half, the 2nd half will deepen understanding of core topics. If you don't understand this early material, the second half will feel like a maze of confusion.

Common Pitfalls (or “Good Ways to Fail”)

Conclude that struggling means you don't/can't get statistics! This course draws on several types of skills, and almost every student (including me!) has struggled with some element of the course. Lack of success in some area is only an indicator that you need to put in more effort, not that you aren't smart enough. We all go through this when learning statistics.

Listen and read *passively*! Write, draw, figure. Think with a pencil in your hand. Turn the concepts into something you do. To succeed, you must be able to explain and execute.

Succeed once, and think you've learned it all! Doing it right once doesn't mean you can necessarily do it again. Getting it wrong helps you understand how the process works. Mistakes help you learn.

Cram for exams! You can cram content, but skills don't compress. Don't fall behind; it's very hard to catch up.

Give up when you get stuck! Get over it. Everyone gets stuck. Math is all about getting stuck and unstuck. When it happens, and it surely will, play around with the problem. Make friends with it. Try a new tactic. *Ask for help.*

Don't do it yourself; just watch others do it! Watching someone go through the steps is a starting point, but you have to get in the pool to learn how to swim.

Grading

Final grades will be based on percentage of total possible points earned, out of 100 (i.e., 100%), and distributed as follows:

A+	<i>Reserved for exceptional performance</i>		
A	93-100	D+	67-69.99
A-	90-92.99	D	63-66.99
B+	87-89.99	D-	60-62.99
B	83-86.99	F	<60
B-	80-82.99	N	less than 70***
C+	77-79.99	P	70 or higher***
C	73-76.99		
C-	70-72.99		
		***If taking pass/fail	

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

- 35% Total points earned out of total points possible for all homework assignments, calculated separately for Aplia and SPSS: 70% Aplia HW (24.5 points) and 30% SPSS (10.5 points) (35 points total)
- 40% Total points earned out of total points possible for 4 quizzes out of 5 (lowest grade is dropped) (40 points total)
- 20% Cumulative final exam (20 points total)
- 5% Attendance/Participation (up to 2 classes can be missed without penalty) (5 points total)

How to figure out your grade: I will post a grade calculator. Or – simply apply your math skills.

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 typically be given to a *maximum* of 4-5 students in a class this size. Note: 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.

APPROXIMATE COURSE SCHEDULE

Schedule, homework due dates and quiz dates subject to change at my discretion.

Week	Date	Topic	Reading	Quiz/Assignments
1	T 3/29	Course Introduction, Key Terms		
	R 3/31	Variables, Histograms, Frequency	Ch. 1-2	
	W 3/30	Lab 1		
2	T 4/5	Central Tendency and Variability	Ch. 3-4	
	R 4/7	Z-Scores and the Normal Distribution	Ch. 5	
	W 4/6	Lab 2		HW1 due F 10/9 6pm
3	T 4/12	Probability and Normal Distribution	Ch. 6	Quiz 1 (Ch. 1-4)
	R 4/14	Distribution of Sample Means	Ch. 7	
	W 4/13	Lab 3		HW2 due F 10/16 6pm
4	T 4/19	Hypothesis Testing with z	Ch. 8	
	R 4/21	The one-sample t-test	Ch. 9	Quiz 2 (Ch. 5-8)
	W 4/20	Lab 4		HW3 due F 10/23 6pm
5	T 4/26	Independent samples t-test	Ch. 10	
	R 4/28	Related samples t-test	Ch. 11	
	W 4/27	Lab 5		HW4 due F 10/30 6pm
6	T 5/3	Intro to ANOVA	Ch. 12	Quiz 3 (Ch. 9-11)
	R 5/5	One-way ANOVA		
	W 5/4	Lab 6		HW5 due F 11/6 6pm
7	T 5/10	Factorial ANOVA	Ch. 13.1, 13.3	
	R 5/12	Factorial and Repeated ANOVA	Ch.13.2	
	W 5/11	Lab 7		HW6 due F 11/13 6 pm
8	T 5/17	Repeated ANOVA, ANOVA Review		
	R 5/19	Correlation	Ch.14.1-14.5	Quiz 4 (Ch. 12-13)
	W 5/18	Lab 8		HW7 due F 11/20 6pm
9	T 5/24	Regression	Ch. 14.6	
	R 5/26	Chi-square	Ch.15	
	W 5/25	Lab 9		HW8 due F 11/27 6pm
10	T 5/31	Which Test? Review & Recap		
	R 6/2	Last Quiz (No Lecture Following)		Quiz 5 (Ch. 14-15)
	W 6/1	No Lab		HW9 due F 12/4 6pm
11	6/7	Tuesday, 8:00 a.m. (sorry!)		Cumulative Final

Initial Registration	2/22-3/2
Community Ed Registration	3/14
Classes begin	3/28
Last day to drop classes w/o 'W'	4/4
Last day to reg/add classes	4/6
Last day to withdraw from classes	5/15
Memorial Day holiday*	5/30
Last day of classes	6/3
Final examinations	6/6-10
Spring Commencement	6/13
Grades due (Tuesday noon)	6/14

WHAT STUDENTS SHOULD KNOW TO PASS PSY 302

Students of Psychology 302 (Statistical Methods) learn a variety of statistical terms and procedures. To successfully apply their knowledge to new situations and master the content of Psychology 303 (Research Methods), students also need to acquire a more abstract level of understanding that underlies specific skills.

Here we specify both these abstract principles and the more specific skills:

PRINCIPLES:

1. One goal of statistics is measuring the strength of a potential effect, such as the size of any difference between groups/conditions or relationship among variables. This is done by assessing the size of an effect in a sample (e.g., the difference between two groups) in relation to the total variability in the sample (e.g., the standard deviation around means). Students need to understand how this principle applies to different designs and data sets (e.g., correlation, analysis of variance).
2. Inferential statistical tests allow us to make yes/no decisions about hypotheses by identifying the "range of data situations" that is plausible if the null hypothesis (i.e., no difference among groups or relationship among variables) is correct. For example, under the null hypothesis the distribution of sample differences between two groups has a mean of zero with a standard error determined by variance and sample size. For an analysis of variance the null hypothesis sampling distribution is defined by the ratio of between-group and within-group variance.

SPECIFIC SKILLS

3. Upon reading the description of a study, infer the research question, hypotheses, and study design, and identify the nature of variables involved (dependent vs. independent, scales of measurement).
4. Determine which statistical tests are appropriate for a given research question and data structure.
5. Complete statistical analyses in SPSS, including entering data in the appropriate format, selecting options to get the data needed, and running appropriate tests.
6. Extract key information from the output of SPSS analyses to assess the plausibility of test assumptions, make decisions about hypotheses, and create tables or figures to illustrate the results.
7. Summarize the results of data analyses within an APA-style report, using appropriate statistical terminology and providing an interpretation in light of the research question. This includes presenting the results of hypothesis tests along with appropriate measures of effect size or confidence intervals and relevant descriptive statistics.

Visit the Peer Statistics Tutors!

The Peer Statistics Tutors are students who have completed PSY302 and were selected to become tutors specifically to help current PSY302 students. If you find yourself having trouble in PSY302, just have some quick questions, or even want more practice, stop by to work with one of our tutors! We are happy to help and want you to be able to do your best in PSY302.

WHERE: Straub 237A

WHEN: Tuesday thru Friday, 11am-4pm

(until 6pm on Fridays; exact hours posted in Straub 237A and on Facebook: <https://www.facebook.com/UO302Tutors>)

- Please bring your notes and lab handouts from class
- **We are not here to do your homework for you, just to help.**

Study Tips from the Tutors

- Attend every lecture and lab.
- Take detailed notes during lecture and lab, especially for example problems that will help with homework assignments.
- If you do not understand a concept, get clarification right away because concepts often build upon one another.
- When you write down formulas, make sure to note when they should be used.
- Make study guides or separate notes by type of test: z-test, t-test, factorial ANOVA, etc.
- When writing APA-style summaries, use the examples from lab and lecture to help with wording and formatting.
- Keep up with homework assignments.
- Ask your Professor, GTF, or the Peer Statistics Tutors if you have any questions!

How to Succeed in This Class (and All Your Others, Too!)

Throughout the year, each and every year, I get the following questions from students: “How do I do better on your exams?” “How do I do better in your class?” “What’s the most effective way of studying for your exams?” – and so on...

What follows are my tips for success in this class and others. If you write me to ask, I’ll probably refer you back to this, although you can ask anyway! As a note: *Simply reading this won’t help*...actually following the advice WILL help. This class will be easy for some, moderately hard for others, and very hard for still others, but the most reliable path to succeeding scholastically involves actually WORKING hard at learning a topic. So, to do well, you’ll (probably) need to work hard.

1. **Come to class.** I can’t emphasize this enough. Many students make it for a few classes, and then stop coming regularly. Since I (and most instructors) base many of my exam questions on what I actually discuss in lecture, don’t you think it might be wise to be there? I strive to make class both enjoyable and worthwhile, and what I talk about in there is what I think is important. So come to class...you will certainly do better.
2. **Spend the time!** Each credit hour = 3 hours per week. So in a 4-credit class, you are reasonably expected to spend 10-12 *hours per week* on the class. Who does this, you ask? I reply: “The students who get A’s!”
3. It is almost impossible to cram 4 weeks (or 3 weeks, 2 weeks, 6 weeks) of studying and learning into one night, or a few short study sessions. You need to **distribute your learning**. Devote some of each day to study – not just passively reviewing notes, but actively asking questions of yourself and answering them – and do this continually throughout the semester. Otherwise, you’ll be finding yourself merely cramming right before exams, which is both more painful and less effective as a test preparation strategy.
4. **Read the book.** Although I cover material from the book, I supplement it with my own knowledge of the field, and I don’t cover every little detail. But questions on exams can come from anywhere (i.e., book, lecture, discussion). Some people don’t even GET the book; others get it and never read it. Why not use some of those credit hours reading? And don’t read it all in one session. First, *skim*, to get an idea of what you’ll be reading. Note any questions you might have. Then, go back and read closely. Some parts you may need to read several times to understand. Some parts you may want to ask me or someone else about to make sure you understand correctly. This is OK! Here, an active orientation is also helpful – don’t just read and highlight, but write notes and questions in the margins; have a conversation with the textbook. Doing this *before class* is very useful, because then you have knowledge on which to build on in lecture. If not, you should certainly read after class. But read, you must!
5. **Tie what I discuss to your own knowledge about yourself and others.** We’re talking about psychology here, right? You have a brain, nervous system, social context, personality, etc...and so do all your friends (one can hope!). We know more about ourselves and close others than we know about anything else. So, when I discuss a concept or a fact, try to tie this to your own experiences and prior learning. Same thing when you read about something (see point 4). Do you remember ever doing that thing yourself, or anyone else? Have you experienced what I am discussing? Does it sound kind of like something you know about from another class, a hobby, a movie you like? By tying new knowledge to old, you create a network of understanding that reinforces associated neural connections. This is a good trick for remembering and making information accessible later.
6. **Teach the material to others.** Some of the deepest, most durable learning occurs when you have to teach something to others (that’s why we teachers are generally working hard and learning a lot

over the course of a class, ourselves)! Create a study group and take turns teaching material to each other. If everyone has an area that they are “responsible” for knowing, they will each have at least *some* expertise in *something*! So to learn, teach.

7. **Be active in class, not passive.** Passive means you just sit there and listen or half-listen sometimes. Active means you think about what I’m saying, and ask questions to yourself and to me (and to the class). You try to engage with the material, tying it to your own knowledge and interests. If you’re going to just come and listen, you’re not doing enough...ENGAGE! Try to get excited about what you are learning. If you don’t feel naturally excited, try the time-tested behavioral strategy of “fake it ‘til you make it.”
8. **If you’re going to surf, text, or otherwise remain unengaged, don’t bother coming.** Many students believe it is possible to do several things at once, well. Multitask during class. Well...*psychological research* has shown that this is NOT true. You can do lots of things at once, but you can’t do them all well at the same time. So if you come to class, come ready to engage in learning and to maintain focus on the class. Otherwise, you’re wasting your time. If you want to text or surf, that’s totally fine with me! Just not in class. Further, if I actually catch you texting or surfing, I’ll make a big deal out of it, and you’ll (maybe) be mad that I did. So, if you’re in class, use the time for class.
9. **Practice thinking.** I don’t just teach material. I don’t just teach to exams. I want all of us to practice thinking, to learn to reason (or reason better), to not passively accept but to actively challenge information and ideas. This is how science, including psychology, actually works; previously known “facts” are continually overturned, and grasping the *process* of scientific inquiry is at least as important as the content of any particular study. To me, this is what college is about, regardless of your goals for this class. Being a good thinker is what makes you successful in whatever field you choose to work. So, use class time as practice for living, in general.
10. **Come see me.** Come to my office hours. Ask questions. Students who do this do better, on average, than students who do not. This, however, is simply a correlation.
11. **Speak up in class.** If you have a question, many others probably have the same question. Go ahead and ask. It’s fun and educational! It also helps me to know when I’m not being clear (which certainly happens to all of us occasionally) and will enhance everyone’s learning.

That’s about all I have, for the moment. It encapsulates what I have found to be helpful for myself and for many students over the years. Of course, just reading this handout won’t do it...you’ve actually got to DO these things. That’s the hard part. This is not an easy class to succeed in, although I do try to make it as painless as possible.