STATISTICAL METHODS IN PSYCHOLOGY (PSY 302)
University of Oregon
Winter 2016
T/Th 12:00-1:20 pm ♦ Straub 145 ♦ 4 credits ♦ CRN: 25232
http://canvas.uoregon.edu

Instructor: Nicole Dudukovic, Ph.D.
Email: ndudukov@uoregon.edu
Office: Straub 387
Office Hours: T 1:20-2:20, Th 11-12, & by appt

Teaching Assistant: Job Chen	**Teaching Assistant:** Brianna Delker
Email: zhuochen@uoregon.edu	**Email:** bcdelker@uoregon.edu
Office Hours Location: Straub 008	**Office Hours Location:** LISB 345
Office Hours: W 10-11, 1:20-2, 3:20-4, & by appt	**Office Hours:** F 9:45-11:45 & by appt

Labs:
W 8:30-9:50am, Straub 006 (CRN: 25233)	Brianna
W 10:00-11:20am, Straub 006 (CRN: 25234)	Brianna
W 12:00-1:20pm, Straub 006 (CRN: 25235)	Brianna
W 8:30-9:50am, Straub 008 (CRN: 25237)	Job
W 12:00-1:20pm, Straub 008 (CRN: 25240)	Job
W 2:00-3:20pm, Straub 008 (CRN: 25241)	Job

REQUIRED MATERIALS

♦ **Aplia:** This is an online program you will use to complete homework assignments. **Purchase is required.**

♦ **Text:** Gravetter, F. J., & Wallnau, L. B. (2013). *Essentials of statistics for the behavioral sciences* (8th ed.). Belmont, CA: Thomson/Wadsworth. **This is bundled with Aplia as an e-book. Hard copy 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. **Required.**

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

COURSE DESCRIPTION

Welcome to Statistical Methods! 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 statistical information reported in primary research articles, newspapers, and magazines. You will also sharpen your ability to think critically and logically about scientific research. These skills will provide you with a basic foundation in 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.

This class both is and is not 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 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.

LEARNING OUTCOMES

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.

♦ Use hypothesis-testing procedures to conduct statistical tests (by hand or using statistical software), draw conclusions, and write up the results in APA style based on your analyses.

COURSE EXPECTATIONS

This course promotes active learning through discussion, solving problems, and computer exercises. In many ways the instructor and TAs will act as coaches, but ultimately, it is YOU who must work to learn the concepts and demonstrate your learning. It is OUR goal to help you achieve this. We sincerely want all students to succeed.

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.

STUDENT WORKLOAD

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 homework assignments outside of class.

<div align="center">**COURSE REQUIREMENTS**</div>

Attendance/Participation

You must participate in *ungraded* class exercises using your iClicker to get credit for each day you attend. While you get 2 "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 iClickers: 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 Canvas *by the start of Week 3*. If not registered *by the end of Week 4, you will be unable to earn *any* participation points.*

Homework

Assignments are due each **Friday by 6 pm, electronically.**

Homework has two components:

- ◆ Aplia software questions
    - o These become unavailable when due, so **cannot be turned in late**.
    - o **Make sure to register with Aplia using the same name that you use on Canvas for grading.**
    - o You get up to three attempts to answer questions correctly, but your score will be the *average* of all attempts. It it is in your best interest to try hard and do the best you can the first time!

- ◆ SPSS questions
    - o 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.
    - o For help, see https://blogs.uoregon.edu/canvas/support/ or ask your lab instructor.
    - o SPSS assignments will lose 10% of points every day they are late, including weekend days, starting at 6:00 *sharp* on Fridays. **(Aplia assignments cannot be late; see above).**

Quizzes

There will be 5 in-class quizzes throughout the term (in weeks 3, 5, 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 does not negatively impact your class grade. Because of this, **there are no 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 unless there is a documented medical emergency.*

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.**

Final Exam

The final exam will be cumulative. A major component of the final will be 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.

GRADING

Final grades in this course will be determined by the following:

- ♦ Attendance/Participation (5%) – up to 2 classes can be missed without penalty
- ♦ Homework (35%) – approximately 70% from Aplia, 30% from SPSS
- ♦ Quizzes (10% each; 40% total) – lowest grade of 5 quizzes is dropped
- ♦ Final Exam (20%)

Grades will be distributed as follows:

A+	97-100%	B+	87-89%	C+	77-79%	D+	67-69%	F	0-59%
A	93-96%	B	83-86%	C	73-76%	D	63-66%		
A-	90-92%	B-	80-82%	C-	70-72%	D-	60-62%		

Please see the psychology department guidelines for a description of the type of achievement that each grade signifies: http://psychology.uoregon.edu/courses/department-grading-standards/

SPECIAL NEEDS

Accessible Education Center (AEC)
If you have a documented disability and anticipate needing accommodations in this course, please notify me as soon as possible. Also, please request that a counselor at the Accessible Education Center (uoaec@uoregon.edu, 541-346-1155) send a letter verifying the type of accommodation that is appropriate. For a list of resources provided by the Accessible Education Center, please see http://aec.uoregon.edu

Students for Whom English is a Second Language
 If you are a non-native English speaker and think you may have trouble in this course due to language difficulties, please see me as soon as possible to make any necessary special arrangements.

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.

ACADEMIC INTEGRITY

We 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. 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.

For more information, see the UO website regarding academic honesty at:
http://uodos.uoregon.edu/StudentConductandCommunityStandards/AcademicMisconduct.aspx

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.

HOW TO SUCCEED IN THIS COURSE!

1. **Keep up!**
   ♦ Read before class so you are prepared and ready to participate and get the most out of lecture.
   ♦ Complete homework on time. If you fall behind, it is harder to focus on the new material.
   ♦ Don't try to cram before quizzes and the final exam. Conceptual understanding cannot be crammed. Learning happens best when it is *distributed over time.* Do a little work every day.
   ♦ Don't give up when you are stuck! Keep at it, and ask for help.

2. **Show up!**
   ♦ Come to each and every class and lab.
   ♦ Lab sections are NOT optional, and to complete SPSS homework assignments, you will need content that will be covered only in lab.
   ♦ Go to office hours when you need help. We hold these hours for YOU.

3. **Be active!**
   ♦ Actively participate in your learning and actively engage in the course content.
   ♦ Use the learning checks in your textbook to assess your comprehension.
   ♦ Do the exercises in class and work along with your instructor.
   ♦ Ask questions. Please speak up! This is the only way we will know when something is not explained clearly, and chances are that half the class has a similar question.

CLASSROOM ETIQUETTE

As a courtesy to your instructors and to your fellow classmates, please arrive on time for class and stay for the duration of the class period. Getting up in the middle of class is very disruptive. Please turn off cell phones and any electronic devices that might be distracting to others at the beginning of class. Treat your fellow students and your instructors with respect.

Course Schedule

Course schedule may change, but quiz and homework due dates will not change unless absolutely necessary.

Week	Date	Topic	Reading	Quizzes/Assignments
1	T 1/5	Course introduction & key terms	Syllabus	
	W 1/6	*Lab 1*		
	Th 1/7	Variables, histograms, & frequency	Ch. 1-2	**Register i-clicker**
2	T 1/12	Central tendency & variability	Ch. 3-4	
	W 1/13	*Lab 2*		
	Th 1/14	Z-scores & the normal distribution	Ch. 5	
	F 1/15			**HW 1 due by 6pm**
3	**T 1/19**	Probability & the normal distribution	Ch. 6	**Quiz 1 (Ch. 1-4)**
	W 1/20	*Lab 3*		
	Th 1/21	Distribution of sample means	Ch. 7	
	F 1/22			**HW 2 due by 6pm**
4	T 1/26	Hypothesis testing with z	Ch. 8	
	W 1/27	*Lab 4*		
	Th 1/28	One-sample t-test	Ch. 9	
	F 1/29			**HW 3 due by 6pm**
5	**T 2/2**	Independent samples t-test	Ch. 10	**Quiz 2 (Ch. 5-8)**
	W 2/3	*Lab 5*		
	Th 2/4	Related samples t-test	Ch. 11	
	F 2/5			**HW 4 due by 6pm**
6	T 2/9	Introduction to ANOVA	Ch. 12	
	W 2/10	*Lab 6*		
	Th 2/11	One-way ANOVA		**Quiz 3 (Ch. 9-11)**
	F 2/12			**HW 5 due by 6pm**
7	T 2/16	Factorial ANOVA	Ch. 13.1, 13.3	
	W 2/17	*Lab 7*		
	Th 2/18	Repeated-measures ANOVA	Ch. 13.2	
	F 2/19			**HW 6 due by 6pm**
8	T 2/23	Correlation	Ch. 14.1-14.5	
	W 2/24	*Lab 8*		
	Th 2/25	Regression	Ch. 14.6	**Quiz 4 (Ch. 12-13)**
	F 2/26			**HW 7 due by 6pm**
9	T 3/1	Chi-square	Ch. 15	
	W 3/2	*Lab 9*		
	Th 3/3	Chi-square		
	F 3/4			**HW 8 due by 6pm**
10	T 3/8	Which test? Review and recap		
	W 3/9	*No lab*		
	Th 3/10	Last quiz		**Quiz 5 (Ch. 14-15)**
	F 3/11			**HW 9 due by 6pm**
11	**F 3/18 8:00am**			**Cumulative Final Exam**

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.