

# Applied Statistics for Psychology

PSYC 230

Fall 2006

White Hall, 206; MWF 3:00-3:50

## Instructor Information

Instructor: Phillip Wolff, PhD

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Office: Psychology 321

Office #: 404-727-7140

Office hours: Wednesday, 9:00 – 11:00 am; Thursday, 2:30 – 3:30 pm; Other times by appointment

## Contacting Me

Email is the best way to reach me. Feel free to email me anytime. The telephone is the most inefficient way to reach me. My office hours are open to all students so I typically do not make appointments during office hours (first come, first served). If my office hours come at a bad time for you, please let me know so that we can arrange another time. I'm committed to being available to you throughout the period of the course.

## Teaching Assistants

Widaad Zaman (Lab time: 1:00 – 1:50 TH) [wzaman@emory.edu](mailto:wzaman@emory.edu)

Amy Ransom (Lab time: 3:00 – 3:50 TH) [amy.ransom@emory.edu](mailto:amy.ransom@emory.edu)

Erin Jones (Lab time: 4:00 – 4:50 TH) [erin.jones@emory.edu](mailto:erin.jones@emory.edu)

Benjamin Basile (Lab time: 11:45 – 12:35 F) [bbasile@emory.edu](mailto:bbasile@emory.edu)

Jennifer Andrews-McClymont (Lab time: 12:50 – 1:45 F) [jgandre@emory.edu](mailto:jgandre@emory.edu)

## Places and Times

Classes: White Hall 206, 3:00 – 3:50 MFW

Labs: 1462 Clifton Road, RM 123 (see above for times)

## Course Content

This course provides an introduction to descriptive and inferential statistics commonly used in psychological research. Descriptive statistics include measures of central tendency, variability, and association. Probability and the logic of statistical inference are addressed. The class covers a broad range of parametric and nonparametric statistics. Emphasis is given across the course to scale of measurement, statistical power, and the interpretation of results of statistical tests. Examples are taken from psychological research.

## Format

The course will be conducted as a lecture class, but students are strongly encouraged to ask questions at any time.

## Course Materials

Main text (with CD-ROM). Hurlburt, R. T. (2006). *Comprehending behavioral statistics* (4th ed.). Belmont, CA: Wadsworth/Thomson Learning.

Optional text. Kirkpatrick, L. A., & Feeney, B. C. (2006). *A simple guide to SPSS for Windows for Version 12.0 & 13.0*. Belmont, CA: Wadsworth/Thomson Learning.

## **Blackboard**

The class will use Blackboard at Emory [<http://classes.emory.edu>] as our primary communication tool. The course is listed as “Applied Statistics for Psychology (Wolff).”

Lecture Slides. I prepare PowerPoint slides for all class lectures. I will usually make one set of slides for each chapter in the textbook, so a set of slides may cover more than one class session. Keep in mind that I will not repeat everything that is on the slides. I will TRY to post the PowerPoint slides on Blackboard prior to each class session in the Class Documents section. You may download the slides and use them as the basis for your notes. The PowerPoint slides are NOT intended to substitute for your class attendance or for required reading.

Materials and Information for SPSS labs. I will post datasets and instructions for labs.

Web Tutorials. Nancy Bliwise (in collaboration with psychology graduate students) has developed a series of web-based tutorials that review some central concepts in statistics – scale of measurement, sampling, sampling distributions, central limit theorem, the correct tests of means, statistical power, correlations/regression, factorial ANOVA, and choosing the correct parametric or nonparametric test for an hypothesis.

The tutorials are designed so that you can work through them at your own pace and as many times as you need to fully understand the concepts. They are available on Blackboard site under Course Documents. Other tutorials and demonstrations are also available online. Web links to these tutorials are posted on Blackboard under “External Links.”

Tutorial quizzes. After completing a web tutorial, you can take a tutorial quiz. Your score will be included for course extra credit only if you have done the tutorial. Be careful opening the quizzes. If you open the file and do not take or complete the quiz, you will not be able to open it again.

Answers to HW Assignments. The answers to homework assignments will be posted under Course Documents (after the due date for the assignments passes).

Study guides. A study guide will be posted on Blackboard a few days before each exam. Relevant formulas will also be posted.

Practice Exams. A practice exam will be posted on Blackboard a few days before each exam. These practice exams contain questions from previous exams. They are designed to give you a sense of the type and difficulty of questions on the exam. Once you have completed the practice exam, the correct answers will be provided. This will help you to focus your studying on areas of difficulty. No extra credit is given for completing practice exams; they are designed for study.

Grades. Grades will be posted in a confidential manner on Blackboard. You can check your course grades through “Student Tools.”

## **Things to Bring to Every Class**

Text book. Among other things, the textbook has appendices with probability tables that we will often use during class.

Calculators. It is essential that you bring a statistical calculator to each class session as we typically do at least one example or practice per class session. Statistical calculators have square and square root functions and calculate means, standard deviations, sums, and sums of squares (e.g., TI-30XIIS).

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## Lab Sessions

All lab sessions are conducted by graduate teaching assistants. Each teaching assistant will prepare and distribute a syllabus for his/her lab that outlines expectations and lab procedures. The optional text by Kirkpatrick and Feeney (2006) also provides additional guidance for students.

Lab activities. The laboratory sessions will provide direct instruction in computer-assisted statistical analysis. SPSS (Statistical Package for the Social Sciences) will be used for all analyses. These analyses will be based on data collected during the labs. The laboratory sessions will also provide students with the opportunity to ask questions about the course material in smaller group settings.

Lab reports. Students will complete 8 lab reports during the course of the semester. These reports will be directly linked to the material covered in class and will involve analyzing data using SPSS. They will give you an opportunity to apply what you have learned in class and in lab to examine “real” research questions.

Do not expect to always complete your lab assignments in the 50-minute time period. SPSS is available on all computers in Cox Hall and on selected computers in the library (all computers in Infocommons and in the data lab). Some of the computers in common areas in campus dormitories also may have SPSS installed. Students may also purchase a student version of SPSS. The student version of SPSS does not include all procedures and limits the number of variables that you can work with on a datafile, so it may be easier to do your SPSS analyses on campus.

Students may work together on the statistical analyses and interpretation of the findings. However, the written report that summarizes the analyses, findings, and interpretation must be prepared independently. This written report should contain original ideas beyond those discussed with classmates. If the wording in two lab reports is too similar, it will be considered an honor code violation.

## Evaluation Methods and Policies

Exams. There will be four one-hour examinations and a final examination.

- As concepts introduced early in the class will carry over to statistical techniques learned later in the class, all exams after the first will have a cumulative component. Students are not required to memorize formulas; all necessary formulas will be provided for examinations. All examinations and all portions of the exams are closed book. All exams must be completed independently. Exams will be based primarily on material covered in class. However, exams will sometimes test knowledge about information that was covered only in the text.
- Students must bring a calculator to all examinations. Graphing calculators (or other calculators that store text) are permitted for exams but must be checked by the instructor or a teaching assistant immediately prior to the exam. Cell phones and other devices (e.g., Blackberry, Palm Pilot) that can store text are not permitted during the exam.
- All exams have a similar format. Tests begin with true/false and multiple choice test items designed to assess basic knowledge. They are followed by a series of short answer questions. Finally, problems that demonstrate your ability to calculate and interpret statistics are given. SPSS printouts that require your interpretation may also be presented.

Homework. Statistics is not a spectator sport: it requires practice. Homework exercises give you the opportunity to practice what you have learned.

- Your textbook provides you with multiple problem sets. The first set (Set A) is designed for practice with all of the answers available in the back of the book. I recommend that you select problems from this set, work them out, and check your answers as you learn the techniques. Do not limit yourself to the problems required for homework. Do as many problems as necessary to fully understand a statistical procedure. Assigned homework problems are generally taken from Set B. Answers are not available for Set B problems

- The chapter, set, and problem number for each homework assignment is listed on the course schedule on the date that it is due.
- In order to receive full credit on homework assignments, all calculations for all steps required to solve these problems must be submitted with your answers. Merely writing down the answer to the problem is not sufficient. Calculators are so sophisticated these days, they can do complex statistics in one step. Being able to work through the steps is essential for good mastery of statistics.
- Work also must be legible to receive full credit. If your handwriting is not organized, neat, and large enough to read, I may ask you to type your homework. Please use dark pencil or pen and use white, lined paper. Avoid light pencil, pastel color pens and graph paper. Homework problems should be calculated to at least two decimal places; once we begin hypothesis testing we will begin to use three decimal places. Rounding error can be quite large with only one decimal place.
- Homework is graded as follows: All students who submit complete and legible answers to all assigned homework questions will receive a grade of "C" (Complete – full points for that assignment). Incomplete work (as outlined above) will result in a homework grade of "I" (Incomplete – zero points for that assignment). Occasionally, partial credit (half points) will be given (at the instructor's discretion) for problems that were initiated but not fully completed.
- Students may work collaboratively, in small groups of 2-3 (no more than 3 students) on homework assignments. If you work in a group, each member must indicate that s/he made an active contribution to the homework by signing the homework assignment before it is submitted. A signature is required in order to receive credit. Signing homework for another student is considered a violation of the honor code. Asking a student to add your name to homework to which you did not make an active contribution is considered a violation of the honor code.
- Each student must turn in a separate homework
- Answers to homework problems will be posted on Blackboard after homework is submitted. Possession of homework answers from a previous class/semester or accessing the site before submitting homework problems is a violation of the Emory Honor Code and will be reported to the Honor Council.
- The lowest homework grade will be dropped in the final calculation of course grades; the remainder will contribute to the final score on percentage basis.

Lab reports. There will be 8 lab reports during the semester. The lowest laboratory grade will be dropped in the final calculation of course grades; the remainder will contribute to the final score on a percentage basis. (See section entitled Lab Sessions for further details)

Class participation. Class attendance will be given as a component of your class participation grade. Class attendance will be recorded using a sign-in sheet.

Lab participation. Lab participation grades will depend upon the grading policies of your lab instructor. These policies will be outlined in the syllabi of the lab instructors.

Extra credit. Students can earn extra credit points (up to a maximum of 30 points) that will be added to their total class score. One way these points can be earned is by completing the assessment at the end of the web-tutorials (1 point/correct answer). These assessment quizzes can be taken until the date of the exam. Extra credit assignments must be completed independently.

## Grading Policy

Although statistics can be difficult for some students, most do quite well in the class. The majority of students receive a grade of B- or better.

The different components of your class grade will be weighted as follows:

- Homework – 120 points (12%)
- Laboratory Reports – 200 points (20%)
- Examinations: 550 points (55%)
- Class participation: 80 points (8%)
- Lab participation: 50 points (5%)
- Extra credit: 30 points (3%)

Course grades will not be curved and will be assigned according to the following point distribution: A (930 – 1000), A- (900 – 929), B+ (870 – 899), B (830 – 869), B- (800 – 829), C+ (770 – 799), C (730 – 769), C- (700 – 729), D+ (670 – 699), D (630 – 669), and F (000 – 629).

## Miscellaneous Other Policies

Attendance. Travel for holidays is not an excused absence. Be sure to plan your schedule (including personal travel arrangements) well in advance to avoid laboratory, class, and exam conflicts.

### Classroom management.

- Please turn off all cell phones and pagers before class begins. In the spirit of community, anyone whose cell phone or pager rings/beeps/meows during class must bring candy or some other sweet treat for everyone in the next class period (this policy also applies to me and the TAs). The only exception is a family emergency.
- Students who disrupt the learning process by distracting the instructor or other students (by talking, passing notes, reading the newspaper, etc.) may be asked to leave the class. Students asked to leave the class must meet with the instructor before they will be able to return.

### Assignments

- Assignments are due at the beginning of class on the date noted on the syllabus. Due dates are listed in the “due” columns on the syllabus. Late assignments will be accepted only with the prior approval of the instructor.
- Assignments can be submitted to the instructor’s mailbox only with the prior approval of the instructor. Before placing an assignment in a mailbox, please have the department receptionist sign the cover page and note the day and time it was submitted. Assignments will not be accepted without a signature.
- Students can make up class/practice exercises missed on days with excused absences (e.g., physical illness, death of close family member, religious holiday or personal or family emergency). Documentation is required. It is up to the student to approach the instructor for the missed assignment during the next class period.
- E-mail assignments will be accepted only with the prior approval of the instructor or TA.

Accommodations. Students who require accommodations for physical and/or learning challenges should present appropriate documentation before the end of the second week of class. Students must also make an individual appointment to discuss the accommodations with me before they will take effect.

Preparing for class. It is very important that you read the assigned material before the class lecture. I may not cover everything that is in the text or on the PowerPoint slides. If you read before class, you’ll be much better prepared what is covered during class.

Asking questions. It is important that you ask questions when you don't understand something that I have said. Feel free to raise your hand at any time.

Questions about grading. I grade all homework assignments and exams (though occasionally I may ask TAs to help out). Teaching assistants grade lab exercises using criteria that we develop in collaboration. I review a random subset of exercises each week to assess consistency across raters. If you have questions about how a lab exercise is graded, first ask your TA for clarification. If you are not satisfied with the response, feel free to ask me to review the assignment. Bring all other questions about grading to me.

### Examinations

- Examinations do not circulate. Exams scores will be recorded at the end of the class period in which exams are reviewed and returned. Students who do not return exams during the review class session will receive a score of "0" for the exam.
- Examinations can be made up in the case of illness or other emergencies, with appropriate documentation and approval by the college office. Make-up exams may differ in form and content from regularly scheduled exams. Students must make up exams before the regular exams are returned in the class.
- Students must bring a calculator to all exams. Graphing calculators (or any other calculator that allows text storage) are permitted for exams but must be checked immediately prior to the exam by the instructor or a teaching assistant to ensure that all text or program registers are clear.
- Students often ask for "extra time" on exams. If it is possible to schedule extra time in the classroom, I will offer an extra half hour so that students can check calculations, etc. The exams will be structured so that they can be completed during the regular class time; the extra time will just be a bonus. Students who would like to take advantage of extra time but have a conflict with another class must contact me prior to the exam to arrange an alternate test time on the same day.
- All exams (and all portions of exams) are closed book/no notes. Work on exams must be independent. Students may not have access to cell phones or other electronic devices except calculators during any exam. The "no electronics" policy also applies when leaving the room for any reason during an exam.

### Honor Code

- The appearance of collaboration on examinations will result in a report to the Honor Council.
- "Signing in" for another student for a lecture when attendance is taken or a laboratory session is a violation of the Emory Honor Code and will also result in a report to the Honor Council.
- Improperly placing a student's name on a homework assignment or class exercise or asking a student to write your name on an assignment to which you did not contribute are violations of the Emory Honor Code and will result in a report to the Honor Council.

## Class Schedule (3:00 – 3:50 RM White Hall 206)

Date	Chap.	Lecture topic / Exams	Due dates for HW problems (Chap./Set/Problem Number)	Lab topics	Due dates for lab reports
Sept. 1	1 & 2	Introduction to Course; Levels of Measurement			
Sept. 4		<b>Labor Day</b>			
Sept. 6	3	Frequency Distributions	1-A7; 1-A8; 2-B13; 2-B15		
Sept. 8	4	Central Tendency	3-B14 (save copy); 3-B17	Introduction & Data Collection	
Sept. 11	5	Variability	4-B17; 4-B22 (separate interval and ratio as shown in class)		
Sept. 13	1	Probability			
Sept. 15	6	Z-scores	5-B14; 5-B18; 5-B22	Central Tendency (Report #1)	
Sept. 18	6	Normal Curve	1-B13; 1-B16 (use decimals; no fractions)		
Sept. 20	7	Sampling	6-B20; 6-B21; 6-B25; 6-B26		Report #1
Sept. 22	7	Central Limit Theorem		Exam Review	
Sept. 25	1-6	<b>EXAM #1</b>			
Sept. 27	8	Estimation & CIs	7-B9; 7-B13; 7-B-14		
Sept. 29	8	Confidence Intervals		Variability (Rep. #2)	
Oct. 2	9	Hypothesis Testing	8-B14; 8-B15; 8-B24		
Oct. 4	10	One-Sample t-test			Report #2
Oct. 6	9	Type I & Type II Error		One-Sample t-test (Report #3)	
Oct. 9		<b>FALL BREAK</b>			
Oct. 11	13	Statistical Power	9-B11; 9-B13; 9-B15; 9-B16		Report #3
Oct. 13	11	Independent Samples t-test	13-B10; Statistical Power Tutorial (submit all practice exercises)	Exam Review	
Oct. 16	7-9; 13	<b>EXAM #2</b>			
Oct. 18	11	Independent Samples t-test	10-B10; 10-B12		
Oct. 20	12	Paired Samples t-test	11-B9; 11-B10; 11-B11	Indep. & Dependent t-tests (Report #4)	
Oct. 23	12	Comparing Tests?			
Oct. 25	16	Linear Association	12-B10; 12-B11; 12-B16		Report #4
Oct. 27	16	Spearman r		Exam Review	
Oct. 30	10-12	<b>EXAM #3</b>			
Nov. 1	16	Factors Affecting r			
Nov. 3	17	Linear Regression	16-B13; 16-B14; 16-B15; 16-B19	Correlation (Rep. #5)	

Nov. 6	17	Linear Regression			
Nov. 8	14	Multiple Regression			Report #5
Nov. 10	14	Introduction to ANOVA	17-B18; 17-B19; 17-B20; (ZxZy values are incorrect in book - use computational formulas)/ Multiple Regression Dataset Problem - Posted on BB	Exam Review	
Nov. 13	16-17	<b>EXAM #4</b>			
Nov. 15	14	F-Ratio			
Nov. 17	15	Calculations in ANOVA	14-B11; 14-B18; 14-B20	Review & One-way ANOVA (Report #6)	
Nov. 20	15	Multiple Comparisons			
Nov. 22	15	Repeated Measures ANOVA			Report #6
Nov. 24	16-17	<b>THANKSGIVING</b>			
Nov. 27	15	Factorial ANOVA			
Nov. 29	15	Factorial ANOVA (cont.)			
Dec. 1	18	Statistical Interactions	[Do all calculations for all problems] 15-B6; 15-B8; 15-B9	Repeated Measures and Factorial ANOVA (Report #7)	
Dec. 4	18	$\chi^2$ Goodness-of-Fit Test			
Dec. 6	18	$\chi^2$ Test of Independence			Report #7
Dec. 8		Nonparametric Tests		Chi-Square Tests (Report #8)	
Dec. 11	1-18	Choosing Tests <b>LAST CLASS</b>	18-B12; 18-B13; 18-C21-29 (parts a, b & d)		Report #8
Dec. 15		<b>FINAL EXAM</b>	12:30 P.M. - 3:00 P.M		