

PSYC 613: Advanced Statistics & Data Analysis

Credit hours: 3 Prerequisite: PSYC 301 or equivalent

Class meets: M 2 – 4:45 pm in Kin 116 (Call #: 11317)

Instructor: Dr. Cheryl Fortner-Wood

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Office Hours in 134 Kinard Hall by appointment and

- Monday 1-2 pm Wednesday 10–11 am Friday 12:15-1:15 pm

Course Purpose, Learning Goals and Outcomes

In this course we will focus on running, interpreting, and critiquing others' use of the statistical analyses you will most likely encounter and use in the field. Links between research methodology and quantitative statistical procedures will be discussed. I want us to enjoy learning about statistics as much as possible and to utilize every good resource we have available. When you come across something you find helpful, please share it with the class (psyc613001@class.winthrop.edu). Also, I encourage you to work on all non-exam assignments together.

As the Statistics course in Winthrop's School Psychology Graduate Program, this course is designed to address Standard 2.9 of the National Association of School Psychologists' Graduate Program Certification Standards. That standard reads:

2.9 Research and Program Evaluation: *School psychologists have knowledge of research, statistics, and evaluation methods. School psychologists evaluate research, translate research into practice, and understand research design and statistics in sufficient depth to plan and conduct investigations and program evaluations for improvement of services (<http://www.nasponline.org/certification/standards.html>).*

Students who successfully complete this course will be able to accomplish the following objectives adapted from NASP's expanded description of Standard 2.9:

1. *Have knowledge of statistics in sufficient depth to evaluate published research and to plan and conduct their own investigations.*
2. *Integrate knowledge of statistics when collecting data about school and community programs and in other program accountability activities.*
3. *Provide leadership in schools and other agencies in understanding and using research and evaluation data.*
4. *Apply knowledge and skills in statistics to assist school or agency personnel with valid interpretation and use of school and/or district data.*
5. *School psychologists provide information about relevant research findings to school personnel, parents, and the public.*

Required Reading – Selected Chapters from:

Salkind, N.J. (2008). *Statistics for People Who (Think They) Hate Statistics 3rd Ed.*
Thousand Oaks, CA: Sage Publications.

Warner, R. M. (2008). *Applied Statistics: From Bivariate Through Multivariate Techniques.*
Thousand Oaks, CA: Sage Publications.

Students with Disabilities

Winthrop University is dedicated to providing access to education. If you have a disability and require specific accommodations to complete this course, contact Services for Students with Disabilities, at 323-3290. Once you have your official notice of accommodations from Services for Students with Disabilities, please inform me as early as possible in the semester.

Student code of conduct

Academic dishonesty of any form (including but not limited to cheating, plagiarism, falsifying information) may result in a student receiving an F for this course.

Class Listserv: PSYC613001@class.winthrop.edu

I will use the class listserv to share information with you quickly and efficiently. Many of you were automatically added to the listserv. Some students may need to manually add themselves to the list (e.g. if you recently added a Winthrop email address or the class). Directions for subscribing manually are found at: www.winthrop.edu/acc/classlist.htm. If you have trouble receiving messages from the list, please check your auto-forward settings and/or be sure you have not exceeded your email quota.

Modifications to this Syllabus

The instructor reserves the right to make modifications to this syllabus if the needs of the class warrant. Students will be notified in class and via the class listserv of any modifications. All students are responsible for the consequences of those modifications regardless of their attendance in class on that day.







Course Requirements

Final grades will be based on performance on 9-10 quizzes (10 points each), comprehensive midterm and final exams (100 points each), and two oral presentations (50 points each). The total possible points one can earn in this course: 400.

<u>Grade</u>	<u>Points</u>	<u>Allowable absences</u>
A	360-400	1
B	320-359	2
C	280-319	3
F	<280	4 or more

Quizzes. To monitor your progress throughout the course and prepare you for our two exams, we will have in-class quizzes. These will be relatively brief exercises. Quizzes will focus primarily on what we discussed in the previous class but be prepared to be asked anything covered during the semester up to the point of that quiz. Feedback on quizzes is typically provided by the next class period.

First Oral Presentation. Each student is required to lead the follow-up discussion of one statistical analysis. This will take place in a class following my discussion of that strategy. This presentation should last approximately 10 minutes and the review of a handout that includes an accurate:

-  Summary of appropriate uses of the analysis strategy
-  Appropriate types of independent and dependent variables
-  List and description of major assumptions of that analysis
-  Step by step instructions of how to analyze data with that strategy
-  Discussion of one example research question analyzed using that procedure
-  Interpretation of results from the example question

I used Randomizer.org to randomly assign students to topics. Your grade will be based on completeness, accuracy, and organization. The benefits of this assignment have proven to be three-fold. 1) This review will allow the presenter to improve their understanding of that analysis strategy. 2) You will likely have to utilize additional/out of class materials to create the handout. Finding these references will provide you with useful skills and resources when you are out on your own. Also, by the end of the semester, the class will have developed quite a hefty collection of additional resources. 3) All students will benefit from the rehearsal of material and presentation of that material in a different style, as well as with the handout.

<u>List of Presentation 1 Topics:</u>	<u>Date</u>	<u>Student:</u>
1. Independent Samples <i>t</i> -test	10/5	Gieseemann
2. Dependent Samples <i>t</i> -test	10/5	Gay
3. One-way Between Subjects ANOVA	10/12	Thomas
4. Factorial ANOVA	10/26	Percival
5. Pearson Correlation	11/2	Ritter
6. ANCOVA	11/9	Rossi
7. MANOVA	11/16	Hildebrant
8. Chi Square	11/23	Richards
9. Bivariate Regression	11/30	Moye
10. Multiple Regression	11/30	Brown
11. Binary Logistic Regression	12/7	Polovick

Second Oral Presentation. Each student will discuss an empirical article focusing on at least one of the statistical procedures we will discuss in class. This presentation should last 10 minutes and include a critique of the researchers' statistical procedures. Your grade will be based on completeness of presentation, accuracy of your critique, and logical

support for your arguments. Please provide a comprehensive handout listing crucial points for each of the areas mentioned below. Your handout should be more detailed than your discussion and should be distributed to all class members.

The second presentation should begin with a brief summary of the study focusing on the hypotheses, sample, statistics, and conclusions (this should last around 3 minutes). The rest of the presentation should focus on critiquing the appropriateness of the statistical procedures for the hypotheses/research questions, issues of power, and adequacy of the conclusions drawn. If the researcher did a good job-say so, support it with our readings and discussions. If not, suggest a better strategy. **BE PREPARED FOR ME TO QUESTION YOUR CONCLUSIONS.**

You will choose the article, but I must approve it to make sure it is appropriate for the assignment. Your two presentations must cover different analyses strategies. Also, no two students may present the same article. In most cases, I prefer for you to find a new article, something published in the last two years. Please choose an article that is particularly relevant for your interests.

Exams: Both exams will test your knowledge of course material discussed up to the date of the exam and will be completed out of class. You will receive the exam at least one week prior to the deadline. Graded exams will be returned within two weeks of submission.

Schedule of Topics

This schedule may change based on the needs of the class. Changes will be announced in class as early as possible. If there is not enough of the appropriate type of variables to complete assignments with our data set, either transform current variables into appropriate variables or create a dummy variable with fake data that will work. We will often use data from: <http://www.icpsr.umich.edu/IAED/studies.html> for our analyses.

My Expectations of You

- 1) You will prepare for, attend, and participate in every class.
- 2) You will be an active learner: raising questions, contributing to discussions both in and out of class, utilizing WebCT, taking accurate and complete notes, attentively reading assignments, and sharing relevant resources you have found with your classmates. Being an active learner also means focusing on the discussions of we are having in class and that you will not text, email, or talk on your cell phone while in class.
- 3) You will complete all assignments according to the directions, honorably, and on time. This includes reading the text before the material is discussed in class.
- 4) You will contact me as soon as possible if you have concerns about understanding material, accessing course materials on Web CT, completing assignments, or your performance in this class.
- 5) You will utilize me as a resource as early as possible in class, during office hours, by appointment, by e-mail, and/or via telephone.
- 6) You will listen and interact effectively and sensitively with fellow classmates and with me even when someone expresses a viewpoint that is very different from you own

Monday	What to Read Before Class
8/31	Orientation to Grad Stats: Jargon & Software
9/7 Setting the Stage	Salkind 1. Statistics or Sadistics? It's Up to You Appendix A: SPSS in Less Than 30 Minutes Salkind 20. The Ten Commandments of Data Collection Salkind 6. Just the Truth: An Introduction to Understanding Reliability and Validity (Cronbach's alpha, etc.)
9/14 Describing Data	Salkind 2. Means to an End: Computing and Understanding Averages (Central Tendency) Salkind 3. Vive la Différence: Understanding Variability (Variability) Salkind 4. A Picture Really Is Worth a Thousand Words (Displaying data, charts and graphs) Warner 4. Preliminary Data Screening, data transformations
9/21 Testing Hypotheses & Transforming Data	Salkind 7. Hypotheticals and You: Testing Your Questions (Null and alternative hypotheses, sample vs. population) Salkind 8. Are Your Curves Normal? Probability and Why It Counts (Normality and z scores) Salkind 9. Significantly Significant: What It Means for You and Me
9/28 Mean Differences	Salkind 10. t(ea) for Two: Tests Between the Means of Different Groups (Independent samples t-tests) Salkind 11. t(ea) for Two (Again): Tests Between the Means of Related Groups (Dependent samples t-tests)
10/5	Salkind 12. Two Groups Too Many? Try ANalysis Of VAriance (ANOVA)
10/12	Salkind 13. Two Too Many Factors: Factorial Analysis of Variance (Factorial ANOVA)
10/19	Fall Break – Midterm Exam due next Class
10/26 Correlation & Dummy Variables	Salkind 5. Ice Cream and Crime: Computing Correlation Coefficients (Pearson R) Salkind 14. Cousins or Just Good Friends? Testing Relationships Using the Correlation Coefficient
11/2	Warner 15. ANCOVA: ANalysis of COVAriance
11/9	Warner 17. MANOVA: Multivariate ANalysis Of VAriance
11/16 Non-Parametric	Salkind 16. What to Do When You're Not Normal: Chi-Square and Some Other Nonparametric Tests Warner 8. Alternative Correlation Coefficients, including Chi Square
11/23 LR	Salkind 15. Predicting Who'll Win the Super Bowl: Using Linear Regression Warner 11. Multiple (Linear) Regression
11/30	Warner 12. Binary Logistic Regression
12/7	Presentation 2 Salkind 17. Some Other (Important) Statistical Procedures You Should Know About
12/14	Comprehensive Final due at 2 pm in Kinard 134 Salkind 18. A Statistical Software Sampler