Fall 8-27-2017

Applied Statistics

Sophia Barrett
CUNY City College

The City College of New York (CUNY) Department of Psychology
Fall 2018 Semester

Applied Statistics
Psychology 21500 Sections LM, LM2, LM3, LM4

Instructor: Sophia Barrett
Email: sbarrett@ccny.cuny.edu
Office: NAC 7/214
Office phone: 212-650-5900
Office Hours: Mondays 1:30 pm – 3:00 pm
Class Meetings:

LM	Tuesdays	9:30 am – 11:30 am	Shepard 304 &	Thursdays	9:30 am – 11:40 am	SH 105
LM2	Tuesdays	9:30 am – 11:30 am	Shepard 304 &	Thursdays	9:30 am – 11:40 am	NAC 1/302
LM3	Tuesdays	9:30 am – 11:30 am	Shepard 304 &	Thursdays	9:30 am – 11:40 am	NAC 6/150
LM4	Tuesdays	9:30 am – 11:30 am	Shepard 304 &	Thursdays	9:30 am – 11:40 am	NAC 1/302

Course pre-requisites: Students should have successfully completed Psychology 102 (Psychology in the Modern World).

Course Description: In this course, you will learn about the mathematical techniques that are used by researchers to organize, summarize, and interpret results from their research studies. Collectively, these techniques are called statistics. During the semester, you will be required to know how to do each of the individual statistical procedures, and you will be required to demonstrate your ability on homework assignments, computer exercises, and on exams.

Course Objectives
This course aims to:

- To promote critical thinking and to enable students to acquire and apply critical thinking to the content of a discipline and to practical problems they confront in other settings.
- To enable students to develop competence in quantitative reasoning and applying statistical procedures on a conceptual level and through the use of statistical software packages.
- To enable students to develop effective communication skills in numerical formats.
- Equip students to use the following statistical approaches:
    - Differentiate descriptive and inferential statistics
    - Interpret different distributions of scores and identify both patterns and deviations
    - Compute measures of central tendency and spread to characterize a set of scores
    - Interpret different kinds of relationships between variables (quantitative, categorical), including correlations
    - Describe the characteristics of a normal distribution
    - Use the concept of standard scores to compare scores from different distributions
    - Be able to estimate probabilities for random variables.
    - Explain the importance of the concept of statistical significance in research; differentiate Type I and II errors

- Describe the logic of hypothesis testing and what kinds of conclusions can be drawn based on the p-value
- Conduct hypothesis tests for population proportions and means
- Evaluate differences where there are independent samples and matched pairs; be able to conduct an analysis of variance and draw appropriate conclusions

Required Texts:

THERE IS NO REQUIRED TEXT FOR THIS COURSE but we have copies of the reference text on reserve in the library.

Reserved Reference Texts (to be found in the NAC Library):

Gravetter, F.J. & Wallnau, L.B. (2013). Statistics for the Behavioral Sciences (10th ed.)

You will also need:

Scientific calculator
Internet connection
Access to Blackboard & Aplia

Attendance and Lateness Policy: The CCNY Bulletin includes the following statements:
1. Students are expected to attend every class of each course in which they are enrolled and to be on time
2. Students will be dropped from the course for excessive absence (No distinction is made between excused and unexcused absences.)
3. It is the College policy that the number of hours absent may not exceed twice the number of contact hours the course meets per week [i.e. for a 4-credit course means that missing more than two class sessions constitutes excessive absence, and results in an automatic WU]

Students who miss more than ***three (3)*** classes before the official drop date (**Tuesday, November 6th, 2018**) can be dropped for excessive absences. Those students have the option to withdraw without academic penalty and should do so. They will have a W placed on their academic record. When a student is dropped for excessive absence, the registrar or instructor will enter the grade of WU. A student may appeal this action to the Committee on Course and Standing in the school in which the course is offered. A WU counts as an F grade in the calculation of the GPA.

Attendance is important. It is expected that students *will attend every class session (lecture and recitation)* and actively participate and do the homework assignments. Two absences are allowed, although not recommended. This is crucial to mastery of the course material. Moreover, students should arrive on time so as to not disturb other students or the instructor. If you do come to class late, please enter as quietly as possible and minimize disruption of the class. If you make a habit of missing class, arriving late or leaving early, it would be advisable to schedule a time to meet with the instructor to discuss the problem. **Three late arrivals (arrivals more than 10 minutes after the start of class) constitute an absence.**

Cell Phone: The use of cell phones in class is inconsiderate and not allowed. Cell phone use in these places is disruptive and diminishes quality of class time. Students who do not abide by this may be asked to leave the class and consequently counted as absent from class.

If you use your electronic device in any manner during a test or a quiz, you will receive a zero for that test or quiz. This policy also applies to iPods, Blackberrys/Blackberries, PDAs, Treos, MP3 players and all other electronic communication and/or data storage devices.)

Assessment: The breakdown of your grade will be as follows:

Attendance	10%
Homework & Assignments	30%
Exams	40%
Cumulative Final (Departmental)	20%
	100%

Points you receive for graded activities will be posted to the Blackboard grade book.

Although not designed to be comprehensive, every exam will build upon the preceding exams to some extent. Participation in class discussions will also be taken into consideration when determining the overall course grade, especially for borderline cases. Participation is based on the quality and quantity of answers given to questions posed by the instructor or other students. All dates and topics on this syllabus are tentative. Dates for exams and assignments will be announced as the class progresses.

Grading Scale:

A+	100-97%	A	96-93%	A-	92-90%
B+	89-87%	B	86-83%	B-	82-80%
C+	79-76%	C	75-71%	C-	70-66%
D	65-60%	F	< 60%		

Make-up Policy:

There will be **no extensions or re-openings allowed for homework assignments**. Plan your time accordingly.

There will be no make-ups for quizzes. If you come to class late, you forfeit your chance at taking the quiz. We do NOT have a reduced time policy.

Since the lowest exam grade is dropped, there will also be **no make-ups** for exams. In the event you don't miss an exam, then the highest 3 exam scores (out of 4) will count towards your final grade.

General Info: You are required to complete the readings BEFORE the assigned class (any changes to this syllabus will be announced in class). The emphasis will be on the paper-and-pencil understanding of statistics and, while every effort will be made to incorporate computer work (Excel or SPSS) into the various lessons, not every section will have a computer component.

Homework: You should check blackboard frequently as there should be assigned homework just about every night. **I realize that it may seem to be a lot of work and *this is correct*. Statistics is a course with requires practice, practice, and more practice**. The secret for success is to keep up with the material. Do not let yourself fall behind. Set a regular schedule for study and homework, make friends and use study groups. As with any technical system, glitches can occur.

Grading note: You will only receive an **INC** for the class IF you are passing the course by the last day of classes and if I agree to do so. You will also get the grade you earn, so if you earn a D, you will not be assigned an F (or vice versa).

Tutoring: We have department tutors available starting from the first day of class. The schedule will be posted outside of my office (NAC 7/214) and the Psychology Department (7/120). Note that tutors will help you understand concepts and the steps in solving problems. **They will NOT assist with homework or other assignments.**

Weekly Topics

Week 1:	Introduction to class What is statistics? Populations vs Samples Types of variables Experimental vs Correlational Studies Levels of Measurements
Week 2:	Summation Notation Frequency distribution tables Frequency distribution graphs Symmetry vs skewness **SPSS**: Coding Guide https://www.youtube.com/edit?o=U&video_id=dQYsXdX_MCQ Opening SPSS https://youtu.be/2Ev3WB3Ltmg
Week 3	Measures of Central Tendency Graphs and Central Tendency Levels of measurement and central tendency **SPSS**: Defining Variables https://www.youtube.com/edit?o=U&video_id=yOewGLG635U Entering Data https://youtu.be/rFg4F64sP0c Frequency distribution table and graph https://youtu.be/rjaFAXn5fC8
Week 4	Measures of Variability Measures of variability and central tendency How to write a descriptive summary **SPSS**: Frequency Analysis, percentiles, histogram https://youtu.be/C7EkT8qXBZg Descriptive Analysis https://youtu.be/J3cuSL78jQ8
Week 5	Exam 1

	z-scores how to read and interpret z-scores how to calculate z-scores how to place z-scores on a graph **SPSS**: z-scores (fast way) https://youtu.be/I1_e5c_EJvo Transform Compute https://youtu.be/7z-BFx9R1z8
Week 6	Intro to probability with scores The normal distribution The unit normal table Finding z, X, or proportions using the unit normal table **SPSS**: Graphs https://youtu.be/LMNwGzH9RoM Select Cases https://youtu.be/M6A6QhaxYO4
Week 7	Probability with samples Distribution of sample means Central Limit Theorem Standard error vs standard deviation Finding z, M, or proportions using the unit normal table **SPSS**: Sorting Data https://youtu.be/-JtovLJEhAM Recode into Different Variables https://youtu.be/SatACYFeMj8 Recode into the Same Variable https://youtu.be/3MPvY9ocVKk
Week 8	Introduction to hypothesis testing Steps involved in hypothesis testing Null vs alternative hypothesis Alpha level (level of significance) Critical values and critical regions Significance Type I vs Type II errors

	Performing a z-test Effect size Writing up the results of your hypothesis test (z-test)
Week 9	Exam 2 One-sample t-test z-test vs one-sample t test degrees of freedom t-test table estimated standard error performing a one-sample t-test effect size writing up the results of your one-sample t-test **SPSS**: T-test Handout
Week 10	Between subjects/independent measures research design Independent measures t-test vs one-sample t-test Degrees of freedom Pooled variance Estimated standard error Performing the independent measures t-test Effect size Writing up the results of your independent measures t-test **SPSS**: t-test Handout
Week 11	Within subjects/repeated measures/matched subjects research design Repeated measures t-test vs independent measures t-test Degrees of freedom for different t-tests Performing the repeated measures t-test Writing up the results of your repeated measures t-test Effect size Research considerations for conducting a repeated measures t-test **SPSS**: t-test handout
Week 12	Exam 3 Introduction to the Analysis of Variance (ANOVA) ANOVA vs t-test Effects of multiple comparisons on type I error Performing the analysis of variance Effect size Post hocs Writing up the results of your ANOVA **SPSS**:

	One-way ANOVA handout
Week 13	
Week 14	Factorial research design Two-way ANOVA Two-way ANOVA vs one-way ANOVA Main effects Interactions Graphs of two-way ANOVAs
Week 15	Correlational Research Design Pearson Correlation Scatterplots Alternatives to Pearson Correlation **SPSS**: Correlation handout

August 2018

August 2018

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September 2018

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Jul 30	31	Aug 1	2	3	4	5
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27 FIRST DAY OF CCNY CLASESS	28 21500 CHAPTER 1 SYLLABUS REVIEW	29	30 21500 CHAPTER 1 SYLLABUS REVIEW	31	Sep 1	2

September 2018

September 2018

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October 2018

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Aug 27	28	29	30	31	Sep 1	2
3 COLLEGE CLOSED	4 21500 CHAPTER 2	5 MONDAY SCHEDULE	6 CHAPTER 2 REVIEW SPSS DATA ENTRY	7	8	9
10 NO CLASSES	11 NO CLASSES	12	13 CHAPTER 3 LECTURE	14	15	16
17	18 NO CLASSES	19 NO CLASSES	20 CHAPTER 4 LECTURE	21	22	23
24	25 CHAPTER 5	26	27 EXAM 1 (CHAPTERS 1 - 4) SPSS CODEBOOK	28	29	30

October 2018

October 2018

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November 2018

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Oct 1	2 CHAPTER 6	3	4 CHAPTER 6 SPSS FREQUENCIES	5	6	7
8	9 CHAPTER 7	10	11 CHAPTER 7 SPSS DESCRIPTIVES	12	13	14
15	16 CHAPTER 8	17	18 CHAPTER 8 SPSS REVIEWING THE OUTPUT	19	20	21
22	23 CHAPTER 9	24	25 EXAM 2 (CHAPTERS 5 - 8)	26	27	28
29	30 CHAPTER 10	31	Nov 1	2	3	4

November 2018

November 2018

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December 2018

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Oct 29	30	31	Nov 1 CHAPTERS 9 & 10	2	3	4
5	6 CHAPTER 11	7	8 CHAPTER 11 SPSS T-TESTS	9	10	11
12	13 CHAPTER 12	14	15 EXAM 3 (CHAPTERS 9 - 11)	16	17	18
19	20 CHAPTER 12	21	22 COLLEGE CLOSED	23 COLLEGE CLOSED	24 COLLEGE CLOSED	25 COLLEGE CLOSED
26	27 CHAPTER 14	28	29 CHAPTER 14 SPSS ANOVAS	30	Dec 1	2

December 2018

December 2018

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January 2019

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Nov 26	27	28	29	30	Dec 1	2
3	4 CHAPTER 15	5	6 CHAPTER 15 SPSS CORRELATIONS	7	8	9
10	11 EXAM 4 (CHAPTERS 12, 14, 15)	12 LAST DAY OF CLASSES	13	14	15	16
17	18	19	20 21500 FINAL EXAM	21	22	23
24	25	26	27	28	29	30
31	Jan 1, 19	2	3	4	5	6