

Statistical Methods
PSYC 1303-001, Fall 2018
CRN: 17700
Time: MW 9:00-10:20 a.m.
Location: PSYC 307

Instructor: Candice Coffman
Office: Psychology Building, Room 113
Email: cfcoffman@miners.utep.edu
Office hours: By appointment
Review session: TBA

Teaching Assistant: TBA
Email: TBA

Textbook

David Freedman, Robert Pisani, and Roger Purves (2007). *Statistics* (Fourth edition).
New York: W. W. Norton & Company.

(ISBN-13: 978-0-393-92972-0. / ISBN-10: 0-393-92972-8)

<https://www.amazon.com/Statistics-4th-David-Freedman/dp/0393929728>

**** You will need the text book, please make sure to buy it ASAP ****

Course Objectives

At the end of the course, students should be able to:

1. Create and interpret histograms.
2. Explain the meaning of the mean and standard deviation, estimate them from a histogram, and calculate them by hand.
3. Identify the main features of the normal curve, state the areas lying within 1 and 2 standard deviations of the mean, and convert raw scores, z-scores and percentiles into each other.
4. Interpret correlation coefficients and calculate them by hand from raw scores.
5. Interpret scatter plots and explain their relationship to the correlation coefficient.
6. Interpret regression equations, calculate them by hand, and draw them (approximately) on scatter plots.
7. Explain the principle of least squares and its relationship to the regression line.
8. Explain and estimate the root mean square error of the regression line at a particular point.
9. State and explain the law of averages.
10. Explain the meaning of sampling error and confidence intervals.

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11. Explain how a sampling distribution is derived and how it differs from a sample distribution or population distribution.
12. Explain the expected value of the mean and the standard error of the mean, and estimate their value from the standard deviation of a sample.
13. Explain the expected value of the proportion and the standard error of the proportion and estimate their value from the standard deviation of a sample.
14. Construct a 95% and 99% confidence interval for the population mean based on information from a sample.
15. Construct a 95% and 99% confidence interval for the population proportion based on information from a sample.
16. Explain the purpose and main principles of hypothesis testing, including: the null and alternative hypotheses, Type I and Type II error, p values, and statistical power
17. Explain the sampling distribution of the difference between two means, their expected value and standard error, and use estimates of them to perform a t-test.

Course Policies

Textbook Policy

The majority of this course will follow the 4th edition of the Freedman et al. book closely -- earlier editions will not be adequate.

On Amazon.com, you can buy the 4th edition new for about \$145, used for around \$18-\$56, or you can rent it for about \$30. I would encourage everyone to keep their statistics textbooks for the long-term: you may find it helpful to have around for future classes or for jobs after you graduate. The used version of the textbook is perfectly acceptable, so long as it is the 4th edition.

Blackboard Policy

The instructor will work to actively update BB with lectures, supplementary materials, and handouts. BB will contain readings for this class that are not from the Freedman et al. book, as well as listings of the homework assignments. Be sure to visit BB regularly.

Technology Policy

To avoid distracting your classmates and the instructor, use of laptops, tablets, and smartphones are strongly discouraged unless absolutely necessary. Many students find it easier to take notes on paper rather than laptops or tablets due to the equations, examples, and class activities.

Calculator Policy

For quizzes and exams, students may use only a simple calculator. A simple calculator is one that (a) performs addition, subtraction, multiplication, division, square roots, and squares, but (b) does not have any memory or statistical functions. Calculators with memory or statistical functions are strictly forbidden during quizzes and tests.

Contacting the instructor

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Please do not use BB to contact the instructor. For best results, use your UTEP email to email the instructor <cffcoffman@miners.utep.edu> with a specific subject line, such as: “PSYC 1303 HW question” or “Statistics lecture question.” Although the instructor will try to answer your emails promptly, please allow 24 hours for a response. The instructor reserves the right to record discussions that take place during office hours. Sensitive information will not be recorded or shared.

Center for Accommodations and Support Services

If you have a disability or need special assistance to succeed in the class, please contact The Center for Accommodations and Support Services (CASS) to arrange classroom accommodations. Their offices can be contacted by phone at 916-747-5148, or by email to <cass@utep.edu>, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Students with disabilities are encouraged to discuss accommodations with the instructor in a manner that they are most comfortable.

Academic Honesty and Integrity

Each student has a responsibility to understand, accept, and comply with the University’s standards of academic conduct.

<http://sa.utep.edu/osccr/academic-integrity/>

<http://sa.utep.edu/osccr/student-conduct/student-conduct-process-appendix/>

Academic dishonesty is unacceptable. Academic dishonesty includes but is not limited to the following:

- Cheating – use or attempted use of unauthorized materials, student aids or information in any academic exercise
- Fabrication – falsifying or inventing information or data in an academic assignment
- Collusion – aid or attempt to aid another student in committing academic misconduct

Students in this class are responsible for their own work. You may not get help from another student or resource (e.g., notes sheet, cell phone, textbook) during quizzes or exams. If you participate in the extra credit, you must do your own work. Changing answers to quiz or exam questions after they have been graded in an effort to dispute or improve your grade is considered academic dishonesty. All quizzes and exams are scanned prior to being returned to students, to ensure that this does not happen. Evidence of academic dishonesty or any other violation of the Standards of Conduct WILL BE REPORTED to the Dean of Students. Students may be suspended or expelled and may have permanent notes included in their records.

UTEP’s code of student conduct and discipline may be found at the following locations:

<http://admin.utep.edu/Default.aspx?tabid=73922>

<http://admin.utep.edu/LinkClick.aspx?link=docs%2fStudent+Conduct+and+Discipline.pdf&tabid=71896&mid=163588>

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Updates & Revisions

The instructor reserves the right to, at any time, update, revise, supplement, and otherwise modify this syllabus and the course calendar. Any such changes to the syllabus or calendar will be announced in class and/or via BB.

Course Requirements

Readings

Most readings are from the Freedman et al. book. Readings that are not from this book will be made accessible on BB.

Quizzes

There will be a quiz on every day that a homework assignment is due, as listed in the course calendar (attached). Quizzes are composed mainly of questions from the homework. To be successful at the quizzes, students need to complete the homework assigned for the week. There will be 11 quizzes this semester. The lowest 3 quiz grades will be dropped and the remaining 8 quizzes will be averaged to contribute 45% of your total grade.

There are no make-ups of any kind for quizzes. Students who arrive late for a quiz will be permitted to take the quiz in the time allotted to the rest of the class. No time extensions will be given to accommodate students who are late to class. However, if a student arrives AFTER another classmate has already completed the quiz, the student will not be permitted to take the quiz (earning a 0 for that quiz). The first quiz will occur at the third meeting of the class. Be sure to have your copy of the book well in advance to prepare.

Copies of each student's quiz will be made by the TA. If a student has a dispute about their grade, they will need to meet with the TA and review the copy together. If a student attempts to change their answer on a quiz, they will be reported to the Dean of Students for academic dishonesty.

Midterms

There will be 2 midterm exams during regular class time. The dates of these exams are listed in the course calendar. The first midterm will cover everything in the readings and lectures to that date. The second midterm will cover everything in the readings and lectures after the first midterm and up until the date of the second midterm. Each midterm will account for 20% of your grade.

Students who arrive late for a test will be permitted to take the test in the time allotted to the rest of the class. No time extensions will be given to accommodate students who are late to a test. However, if a student arrives AFTER another classmate has already

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completed the exam, the student will not be permitted to take the exam (earning a 0 for that exam).

Final Exam

The date and time of the final exam are listed in the course calendar. The final exam will count for 20% of your final grade and is cumulative (i.e., it will cover everything in the course).

Students who arrive late for a test will be permitted to take the test in the time allotted to the rest of the class. No time extensions will be given to accommodate students who are late to a test. However, if a student arrives AFTER another classmate has already completed the exam, the student will not be permitted to take the exam (earning a 0 for that exam).

You will be able to access your final grade through the University about 2 weeks after the final exam. If you want to know your grade before then, you must schedule a meeting time with the instructor after the final exam has been administered. Grades cannot be disclosed via email.

Make-up Exams

There are no make-up exams for midterms or the final without prior arrangement. If you will miss a midterm or the final, you must make arrangements BEFORE it is given. Students are responsible for contacting the instructor to schedule the make-up exam within one week of the original exam.

Students must provide sufficient proof of an excused absence (i.e., funeral card or doctor's note) in order to make-up for a missed exam. A make-up for a midterm must be taken at least within one week before, or at most one week after, the scheduled date for that midterm. A make-up for the final must be taken within two weeks before the scheduled date for the final. Failure to take a make-up exam within these limits will result in a failing grade for that test.

Quiz & Exam Rules

1. Students are expected to sit in assigned seats or change seats if requested to do so by the instructor or proctor.
2. Only simple calculators are allowed during quizzes or exams. Use of any other electronic devices, including cell phones, smart watches, or calculators with memory or statistical functions, is forbidden. Students are asked to place all such devices in their backpacks or sufficiently far away from them to ensure that they cannot be used during the exam.
3. No notes or references of any kind are allowed.
4. No communication of any form between students is allowed.
5. Students who need to leave the testing room during a quiz or exam are asked to place their materials face down on their desk and leave all possessions inside the room. This

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includes cellphones. If leaving the testing room during a quiz or exam, students are expected to leave their cellphone on their desk or chair to show they are not taking it with them.

6. Students who receive an audible call (including audible vibrations) during a quiz or exam are asked to inform the instructor or proctor that their phone has gone off and immediately silence their ringer. If the student deems the call to be an emergency, the student is asked to leave the room to ensure others are not disturbed.
7. A student is not permitted to begin a quiz or exam after another student has already completed the quiz or exam. If a student shows up after someone has already turned a quiz or exam in, they will not be permitted to take that quiz or exam, and will earn a 0 for that assignment.

Failure to comply with these rules will result in a referral to the Dean of Students for Academic Dishonesty.

Grading

Final grades will be based on exams and quizzes. Final grading structure will be as follows:

Quizzes (best 8 of 11)	40%
Midterm Exam 1	20%
Midterm Exam 2	20%
<u>Final Exam</u>	<u>20%</u>
Total:	100%

Final grades for the course will break down as follows:

90.0 – 100.0%	= A
80.0 – 89.5%	= B
70.0 – 79.5%	= C
60.0 – 69.5%	= D
59.5% and below	= F

Quiz & Exam Curves

Quiz and exam grades will be curved according to the whole class' performance. The steps for this curve are:

1. Raw scores are calculated by summing all the points students earned for correct responses.
2. The top 5 students' raw scores are averaged to yield a Top Five Average (TFA).
3. All students' raw scores are then divided by the TFA to yield their grade for that quiz or exam.

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For example, assume the top five raw scores for Quiz 1 are 12, 13, 14, 12, and 14. Josephine's score is 11. In this example, the TFA is calculated $\frac{12+13+14+12+14}{5} = 13$. Therefore, Josephine's grade for Quiz 1 is calculated $\frac{11}{13} = .845 \rightarrow 85\% = B$.

Homework

Homework problems are assigned for each of the readings and can be found on the course calendar. It is highly important that students complete all these homework problems before the day that the reading is due, as explained in the next section. However, these homework problems will not be handed in or graded, and they will not be used in computing your course grade.

Rather, quizzes for each reading will be adapted mainly from the homework questions that were assigned and from material presented in recent lectures. Exam questions will then be taken almost entirely from the homework questions, with slight alterations.

The key to success in this class is to do the assigned readings and the associated homework problems in order to be fully prepared for the quizzes and examinations. Attending the lectures and taking notes will also help with a conceptual understanding of the material, but the real road to success is to do the readings and all the homework questions. Most students can complete the readings and the homework by working about 3 hours per week outside of class.

Supplementary materials

The instructor will post educational materials related to statistics, as well as other academic areas of interest, to BB occasionally. These materials can take the form of podcasts, YouTube videos, or extra readings and are intended to be both informative and interesting. These materials are not required for success in the course but may help enrich your learning and comprehension of the materials. If you find something that helps you better understand the material, share it with me and the class! I can post it in this section.

Grade calculator

An excel sheet will be made accessible on BB that will contain the same formulae the instructor will use to calculate students' grades. Students may use this to manually enter their grades, as the course progresses, to better understand their progress in the course. Students are responsible for inputting their grades correctly and the instructor assumes no responsibility for any miscommunications caused by students using this calculator incorrectly.

Extra credit

There are 5 optional exercises offered to improve your ability to use Excel for basic statistical tasks. These exercises are not required for the class. However, you can earn extra credit if you perform them correctly and submit your work by the specified deadlines. Specifically, you can increase your course grade by 1% for each correctly

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performed Excel exercise that you submit by the specified deadline. As an example, let us say that Josephine's grade for the course, based on Quizzes and exams, is 87%. If Josephine correctly performs all five Excel exercises and submits them on time, she can raise her grade to 92%. Except for the Excel exercises, there are no other opportunities for "extra credit" in this class.

More details about the Extra Credit exercises, including the deadlines for completing them, are posted on Blackboard. You are responsible for remembering the dates each extra credit assignment is due, emailing the TA to get the necessary information to complete each exercise, and turning in your completed assignment by the deadline. Assignments turned in after the deadline will not earn extra credit. These extra credit assignments build on one another, so you must complete each of them in order. If you miss one extra credit assignment, you will be ineligible to complete the later extra credit assignments. For example, if you do not complete extra credit exercises 1 and 2, you will no longer be eligible to complete exercises 3, 4, and 5. Please contact the TA or instructor if you have any questions about this.

**COURSE CALENDAR: STATISTICAL METHODS
PSYC 1303, Fall 2018 [CRN 1770]**

Class	Date	Topic	Assignments due
1	M 08/27/2018	Introduction to course. Variables in statistics.	NONE
2	W 08/29/2018	Histograms.	NONE
Monday – 09/03/18 – Labor Day – University Closed.			
3	W 09/05/2018	Histograms & the normal distribution. Measures of central tendency, and skewed distributions. Deviations.	Quiz #1 (in class) Reading due: <ul style="list-style-type: none"> • Freedman et al. Chapter 3. The Histogram (pages 31-56) Homework: <ul style="list-style-type: none"> • Exercise Set A (pp. 33-34) 1, 2, 3, 4, 5, 6, 7 • Exercise Set B (p. 38) 1, 2, 3, 4 • Exercise Set C (pp. 41-42) 1, 2, 3, 4 • Exercise Set D (p. 44) 1, 2 Review Exercises (pp. 50-55) 1, 2, 4, 5, 7, 9
4	M 09/10/2018	Histograms of deviations & the standard deviation	NONE
5	W 09/12/2018	Standard deviations and z-scores	Quiz #2 (in class) Readings due: <ul style="list-style-type: none"> • Freedman et al. Chapter 4. • The Average and the Standard Deviation (pages 57-77) Homework: <ul style="list-style-type: none"> • Exercise Set A (pp. 60-61) 1, 2, 3, 8, 9 • Exercise Set B (p. 65) 1, 2, 3, 4, 5, 6 • Exercise Set C (p. 67) No homework problems assigned • Exercise Set D (pp. 70-71) 1, 2, 3, 4, 5, 6, 9, 10 • Exercise Set E (pp. 72-73) 1, 2, 3, 5, 6, 8, 9, 10, 11 Review Exercises (pp. 74-76) 1, 3, 5, 6, 8
CENSUS DAY – last day to drop the course without a “W”.			
Thursday, 9/13/18 --- Last day to email TA and request numbers for Extra Credit Exercise 1 ---			

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Class	Date	Topic	Assignments due
6	M 09/17/2018	The relationship between z-scores and percentiles.	Quiz #3 (in class) Readings due: <ul style="list-style-type: none"> • Freedman et al. Chapter 5. • The Normal Approximation for Data (pp. 78-96) Homework: <ul style="list-style-type: none"> • Exercise Set A (p. 82) 1, 2 • Exercise Set B (pp. 84-85) 1, 2, 3, 4(a), 5(a), 5(b) • Exercise Set C (p. 88) 1, 2, 3 • Exercise Set D (pp. 89-90) 1, 2, 3, 4 • Exercise Set E (p. 92) 1, 2 • (Read Section 6, but don't do Exercise Set F) • Review Exercises (pp. 93-95) 1, 2, 4, 5, 6, 7, 8
7	W 09/19/2018	More on the relationship between z-scores, percentiles, and raw scores.	NONE
Thursday, 9/20/18 --- Last day to turn in completed Extra Credit Exercise 1 assignment to TA ---			
8	M 09/24/18	FIRST MIDTERM EXAMINATION	
9	W 09/26/18	Transformations. Measurement error. Formula for a line.	Quiz #4 (in class) Readings due: <ul style="list-style-type: none"> • Freedman et al., Chapter 6. Measurement Error (pp. 97-105) • Freedman et al., Chapter 7. Plotting Points and Lines (pp. 110-116) Homework: <ul style="list-style-type: none"> • Homework for Chapter 6 (first reading): <ul style="list-style-type: none"> ○ Review Exercises (pp. 104-105) 1, 2, 3, 4 • Homework for Chapter 7 (second reading): <ul style="list-style-type: none"> ○ Exercise Set A (p. 111) 1, 2, 3 ○ Exercise Set B (p. 112) 1, 2, 3, 4, 5, 6 ○ Exercise Set C (p. 114) 1 ○ Exercise Set D (p. 115) 1, 2, 3, 4, 5, 6 ○ Exercise Set E (p. 116) 1, 2, 3, 4, 5, 6
Thursday, 9/27/18 --- Last day to email TA and request numbers for Extra Credit Exercise 2 ---			

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Class	Date	Topic	Assignments due
10	M 10/01/18	Correlation coefficient	NONE
11	W 10/03/18	More on correlations and transformations. Introduction to statistical prediction.	<p>Quiz #5 (in class)</p> <p>Readings due:</p> <ul style="list-style-type: none"> • Freedman et al., Chapter 8. Correlation (pp. 119-140) • Freedman et al. Chapter 9. More about correlation. Sections 1 & 2 only (pp. 141-146) <p>Homework:</p> <ul style="list-style-type: none"> • Homework for Chapter 8 (first reading): <ul style="list-style-type: none"> ○ Exercise Set A (p. 122) 1, 2, 3, 4, 5, 6 ○ Exercise Set B (p. 128) 1, 2, 4, 6, 7, 9 ○ Exercise Set C (p. 131) 1, 2, 3, 4 ○ Exercise Set D (p. 134) 1, 2, 3, 4 ○ Review Exercises (p. 134) 1, 3, 7, 8, 9 • Homework for Chapter 9 (second reading): <ul style="list-style-type: none"> ○ Exercise Set A (p. 143) 1, 2, 3, 4, 5, 6, 10 ○ Exercise Set B (p. 146) 3, 4
Thursday, 10/04/18 --- Last day to turn in completed Extra Credit Exercise 2 assignment to TA ---			
12	M 10/08/18	Using regression for prediction (part 1)	NONE
13	W 10/10/18	Using regression for prediction (part 2)	NONE
Thursday, 10/11/18 --- Last day to email TA and request numbers for Extra Credit Exercise 3 ---			
14	M 10/15/18	Using regression for prediction (part 3)	<p>Quiz #6 (in class)</p> <p>Reading due:</p> <ul style="list-style-type: none"> • Freedman et al. Chapter 10. Regression. Sections 1, 2, 3, 5, and Summary (skip section 4)(pp. 158-169, 174-179) <p>Homework:</p> <ul style="list-style-type: none"> • Exercise Set A (p. 161) 1, 2, 4 • Exercise Set B (p. 163) 1, 2, 3 • Exercise Set C (p. 167) 1, 2, 3 • Exercise Set E (p. 175) 1, 2, 3 • Review Exercises (pp. 176-178) 1, 2, 3, 5, 6, 9, 10

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Class	Date	Topic	Assignments due
15	W 10/17/18	Finding the equation of the regression line	Quiz #7 (in class) Readings due: <ul style="list-style-type: none"> Freedman et al., Chapter 12. The Regression Line. Sections 1 and 2 (pp. 202-211). Skip section 3. Homework: <ul style="list-style-type: none"> Homework for Chapter 12: <ul style="list-style-type: none"> Exercise Set A (p. 207) 1, 2, 3, 4 Exercise Set B (p. 210) 1, 2 Review Exercises (pp. 213-214) 1, 2, 4
Thursday, 10/18/18 --- Last day to turn in completed Extra Credit Exercise 3 assignment to TA ---			
16	M 10/22/18	RMS Error for Regression	No Quiz today. Readings due: <ul style="list-style-type: none"> Freedman et al., Chapter 11. R.M.S. Error for Regression. Sections 1-4 and Summary. (pp. 180-195,201). Skip section 5. Homework: <ul style="list-style-type: none"> Homework for Chapter 11 (first reading): <ul style="list-style-type: none"> Exercise Set A (p. 184) 1, 2, 3, 4, 5, 6, 7, 8 Exercise Set B (p. 187) 1, 2(a), 2(b), 3 Exercise Set C (p. 189) 1, 2, 3 Exercise Set D (p. 193) 1, 2, 3, 4, 5(a), 5(b), 5(c), 5(d), 7 Review Exercises (p. 198) 1, 3
17	W 10/24/18	SECOND MIDTERM EXAMINATION	
Thursday, 10/25/18 --- Last day to email TA and request numbers for Extra Credit Exercise 4 ---			
18	M 10/29/18	Introduction to Probability	NONE
19	W 10/31/18	The law of averages	Quiz #8 (in class) Readings due: <ul style="list-style-type: none"> Freedman et al., Chapter 13. What Are the Chances? Sections 1 & 2 only (pp. 221-227) Freedman et al., Chapter 16. The Law of Averages. Section 1 only. (pp. 273-277)

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Class	Date	Topic	Assignments due
			Homework: <ul style="list-style-type: none"> • Homework for Chapter 13 (first reading): <ul style="list-style-type: none"> ○ Exercise Set A (p. 225) 1, 2, 3, 4 ○ Exercise Set B (p. 227) 1, 2, 3, 4 • Homework for Chapter 16 (second reading): <ul style="list-style-type: none"> ○ Exercise Set A (pp. 277-278) 1, 2, 3, 6, 7, 8
Thursday, 11/01/18 --- Last day to turn in completed Extra Credit Exercise 4 assignment to TA ---			
Friday 11/02/18 – DROP DEADLINE – last day for students to drop with a “W”			
20	M 11/05/18	Surveys and polls: populations, samples, and the sampling distribution	NONE\
21	W 11/07/18	Surveys and polls: the expected value and the standard error	Quiz #9 (in class) Reading due: <ul style="list-style-type: none"> • Sampling, Surveys, and Political Polls (Posted on BB) Homework: <ul style="list-style-type: none"> • Posted on BB
Thursday, 11/08/18 --- Last day to email TA and request numbers for Extra Credit Exercise 5 ---			
22	M 11/12/18	Confidence Intervals (CI): Part 1	NONE
23	W 11/14/18	CI: Part 2	Quiz #10 (in class) Reading due: <ul style="list-style-type: none"> • Confidence Intervals (Posted on BB) Homework: <ul style="list-style-type: none"> • Posted on BB.
Thursday, 11/15/18 --- Last day to turn in completed Extra Credit Exercise 5 assignment to TA---			
24	M 11/19/18	Null hypothesis significance testing (part 1)	NONE
--	W 11/21/18	TBD	NONE

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Class	Date	Topic	Assignments due
25	M 11/26/18	Null hypothesis significance testing (part 2)	Quiz #11 (in class) Reading due: <ul style="list-style-type: none"> • Null Hypothesis Significance Testing and the t-test (posted on BB) Homework: <ul style="list-style-type: none"> • Posted on BB.
26	W 11/28/18	Type I & II error	NONE
27	M 12/03/18	Statistical power and how to increase it	No quiz Reading due: <ul style="list-style-type: none"> • Type II Error and Statistical Power. Homework: <ul style="list-style-type: none"> • Posted on BB.
28	W 12/05/2018	Review for final	NONE
30	M 12/10/18	FINAL EXAMINATION – from 10:00am – 12:45 pm in our regular meeting room.	