

Sociology 3811: Basic Social Statistics

Spring 2015 ~ <http://www.rob-warren.com/basic-social-statistics--soc-3811--spring-2015.html>

Staff

Professor: **Rob Warren** (warre046@umn.edu) ~ 1172 Social Sciences

Lectures: Tuesdays ~ 6:20pm to 8:50pm ~ 120 Blegen

Office Hours: I have reserved Tuesdays from 5:30pm to 6:00pm and Fridays from 8:00am to 8:45am for drop-in office hours. I am on campus pretty much every day and would be happy to set up an appointment to meet with you outside of these office hours. I can probably answer many questions by email. Please ask questions!

Teaching Assistant: **Dominique Harding** (hardi213@umn.edu)

Section 9: Thursdays ~ 4:30pm to 6:10pm ~ 440 Blegen

Section 10: Thursdays ~ 6:30pm to 8:10pm ~ 440 Blegen

Office Hours: 1:00pm to 4:00pm Thursdays and by appointment ~ 1181 Social Sciences

Description

Sociology 3811 is designed to familiarize students with fundamental statistical concepts and techniques. Because this is a sociology course, most of the examples and demonstrations will be drawn from the social sciences; however, the concepts and techniques presented in the course apply much more broadly to other disciplines and to other arenas of life. Students are not expected to become expert statisticians, but they are expected to gain an understanding of how statistics can be used to address social science and other kinds of questions. Students will become knowledgeable and critical consumers of statistical information that appears in the media, in the workplace, and elsewhere. Students will also gain basic familiarity with the statistical software package Stata.

The course includes overviews of the logic of sampling and causal inference; techniques for graphically and numerically describing distributions; the normal curve; relationships between quantitative variables; relationships between categorical variables; analysis of variance; probability; random variables; sampling distributions; statistical inference; confidence intervals; hypothesis testing; bivariate linear regression; analysis of covariance; and multiple linear regression.

Each of these concepts is founded on core mathematical bodies of knowledge. In the course, students are exposed to the mathematic knowledge that underlies each concept, but they are also shown how each concept applies to real world issues and debates. What is more, they are asked to demonstrate their mastery of the mathematical concept and its practical application in a variety of contexts (including in-class discussions, problem sets, software applications, and exam questions). For instance, students are taught the mathematical foundations of probability and sampling theory; they are taught about sampling distributions; and they are shown the real-world implications of these ideas for how social science knowledge is gained through surveys of randomly sampled observations. *As a result of this orientation, Sociology 3811 meets the Council on Liberal Education's "Mathematical Thinking" Core requirement.*

Requirements

1. Syllabus Comprehension (Total of 30 points)

By the start of class on Tuesday, January 27 please read, sign, and return a paper copy of the "Syllabus Comprehension" page attached to this syllabus.

2. Exams (Total of 500 Points)

Exam #1	Thursday, 2/12 (in Lab)	Material Covered: 1/20-2/3	Points: 100
Exam #2	Tuesday, 3/10 (in Class)	Material Covered: 2/10-2/24	Points: 150
Exam #3	Thursday, 4/9 (in Lab)	Material Covered: 3/24-3/31	Points: 150
Exam #4	Thursday, 5/7 (in Lab)	Material Covered: 4/14-4/28	Points: 100

Examinations will consist of short-answer questions and problems, although I may mix in a few multiple choice questions. You will need a calculator to complete each examination. Examinations must be taken at the scheduled time and on the scheduled day unless: (1) you provide documentary evidence of some serious, unforeseen emergency (death in family, car accident, etc.); (2) you arrange with me – not your TA – to take the examination early; or (3) you notify me – not your TA – in advance of some religious observance or University sponsored event that precludes your taking the examination. In the latter case, you must arrange with me – not your TA – to schedule an alternative exam date and time.

3. Problem Sets (Total of 180 Points)

Problem Set #1	Due: Thursday, 2/5	Material Covered: 1/20-1/27	Points: 20
Problem Set #2	Due: Thursday, 2/12	Material Covered: 2/3	Points: 20
Problem Set #3	Due: Thursday, 2/19	Material Covered: 2/10	Points: 20
Problem Set #4	Due: Thursday, 2/26	Material Covered: 2/17	Points: 20
Problem Set #5	Due: Thursday, 3/5	Material Covered: 2/24	Points: 20
Problem Set #6	Due: Thursday, 4/2	Material Covered: 3/24	Points: 20
Problem Set #7	Due: Thursday, 4/9	Material Covered: 3/31	Points: 20
Problem Set #8	Due: Thursday, 4/23	Material Covered: 4/14	Points: 20
Problem Set #9	Due: Thursday, 4/30	Material Covered: 4/21	Points: 20

Problem sets are due when class begins on the due date. Those turned between 1 minute and 24 hours late will receive no more than 50% credit. Those turned in more than 24 hours late will be reviewed and corrected but will not receive credit. All problem sets must be typed, printed, and turned in on paper; TAs will only accept emailed problem sets under extraordinary circumstances that are approved in advance. Problem sets will be scored according to the criteria described below; in short, scores are based on the accuracy and completeness of answers and on students' demonstrated effort and understanding of the material. Students may not work together on Problem Sets. What gets turned in must represent student's own original work.

4. STATA (Statistical Software) Exercises (Total of 80 Points)

STATA Assignment #1	Due: Thursday, 2/5	Points: 20
STATA Assignment #2	Due: Thursday, 3/5	Points: 20
STATA Assignment #3	Due: Thursday, 4/9	Points: 20
STATA Assignment #4	Due: Thursday, 4/23	Points: 20

STATA Assignments are due when class begins on the due date. Those turned between 1 minute and 24 hours late will receive no more than 50% credit. Those turned in more than 24 hours late will be reviewed and corrected but will not receive credit. All STATA assignments must be typed, printed, and turned in on paper; TAs will only accept emailed assignments under extraordinary circumstances that are approved in advance. STATA assignments will be scored according

to the criteria described below; in short, scores are based on the accuracy and completeness of answers and on students' demonstrated effort and understanding of the material. Students may not work together on STATA Assignments. What gets turned in must represent student's own original work.

5. Lecture Worksheets (10 points each, for a total of 110 Points)

I will distribute a worksheet at the beginning of every lecture---except on days when there is no class session (3/17), when class consists of an exam review (3/3 and 4/7), or when there is an in-class exam (3/10). That means there are 12 worksheets. Each worksheet will provide the main points or "take home messages" from each lecture on one page and a set of questions or problems on the other page. Worksheets---which will be returned to students the next time their lab meets---are due at the end of each lecture session, and will be graded on a pass/fail basis. Students may miss one worksheet and still receive full credit for this requirement; students who do more than the required 11 worksheets can earn extra credit (up to 10 extra points).

6. Lab Participation (10 points each lab, for a total of 100 Points)

In lab sessions, students will review material from lecture in a different way; go over answers to problem sets and exams; and have the opportunity to ask questions and discuss material in a smaller group setting. Labs will not meet on 1/22, 3/12, or 3/19, and there are exams during lab times on 2/12, 4/9, and 5/7. However, TAs will evaluate students' participation in the remaining lab sessions on a pass/fail basis. Students who do not attend cannot participate. Those who attend without participating in any positive way will not receive credit. Students may miss one of the 11 lab sessions and still receive full credit for this requirement; students who participate in more than the required 10 lab sessions can earn extra credit (up to 10 extra points).

7. (Optional) Extra Credit: Research Seminars (Maximum of 50 Points)

Each week on campus there are several public presentations of ongoing social science research by faculty, students, visitors, and professional staff. Very often, the research described in those presentations employs the sorts of methods described in Sociology 3811. Students can earn extra credit by attending these public presentations and writing brief reports about them.

The course web site contains a list of social science research presentations scheduled for fall 2012 that use statistical techniques. These presentations are automatically "acceptable" for this requirement; others may be added over time. Students may petition (by email, to me) to have other live (not on-line) presentations added to the list. Students can earn extra credit by attending the talk and then turning in to their TA (on paper) a one-page (single-spaced, normal font and margins) report that describes (1) who gave the talk, where they gave it, and when they gave it; (2) what the basic question or thesis of the research was; (3) what the basic conclusion or finding was; (4) how the presenter used statistical reasoning to draw their conclusions; and (5) what questions or concerns students had about the research or its findings. These reports must be turned in within a week of the presentation. Students will earn 10 extra credit points for each such report that they turn in (and that contains basically correct information and answers), up to a maximum total of 50 points for the entire semester.

Grades

This course is designed to allow distinctly different types of students to succeed. As described above, there are 1,000 total points in the course (not counting extra credit). I will calculate your course grade using three different formulas (described below) and then give you the *highest* of the three grades.

Formula #1: 75% Exams, 25% Everything Else (“I’ve taken stats before, I am good at math, and I may be bored in this class.”)

$$\text{Your percentage} = \frac{(0.75 \times \text{Exam Scores}) + (0.25 \times \text{Everything Else}) + \text{Extra Credit}}{500} \times 100\%$$

Formula #2: 25% Exams, 75% Everything Else (“I’m being forced to take this class, I’m not very good at math, but I’m willing to work pretty hard.”)

$$\text{Your percentage} = \frac{(0.25 \times \text{Exam Scores}) + (0.75 \times \text{Everything Else}) + \text{Extra Credit}}{500} \times 100\%$$

Formula #3: 50% Exams, 50% Everything Else (“I’m OK at math but I have a lot going on this semester.”)

$$\text{Your percentage} = \frac{(0.50 \times \text{Exam Scores}) + (0.50 \times \text{Everything Else}) + \text{Extra Credit}}{500} \times 100\%$$

I will compute your percentages using all three formulas above, I will keep only the highest percentage, and then I will assign a letter grade as per the rubric below.

<u>Grade</u>	<u>Percentage</u>	<u>Grade</u>	<u>Percentage</u>	<u>Grade</u>	<u>Percentage</u>
A	93.0% to 100.0%	B-	80.0% to 82.9%	D+	67.0% to 69.9%
A-	90.0% to 92.9%	C+	77.0% to 79.9%	D	63.0% to 66.9%
B+	87.0% to 89.9%	C	73.0% to 76.9%	F	less than 63.0%
B	83.0% to 86.9%	C-	70.0% to 72.9%		

Below are three example students and how I would assign grades for them.

Student A: Did great on the exams (490 out of 500 points), got most of the credit for the problem sets and STATA assignments (200 out of 260 points), got no credit for any other assignments (0 out of 240 points), and did no extra credit.

Student B: Did poorly on exams (250 out of 500 points), got nearly full credit on problem sets and STATA assignments (240 out of 260 points), always attended and participated in lecture and labs (240 out of 240), and got 10 extra credit points.

Student C: Did so-so on exams (350 out of 500 points), got most of the credit for problem sets and STATA assignments (190 out of 260 points), usually attended and participated in lecture and labs (190 out of 240), and got 10 extra credit points.

	Formula 1	Formula 2	Formula 3	Grade
Student A	84%	55%	69%	84% = B
Student B	64%	87%	75%	87% = B+
Student C	74%	77%	75%	77% = C

Other Notes

1. Textbook

There is no *required* (physical, paper) textbook for this course. This is because there are plenty of online resources that are just about as good ... and that cost \$0. Some good examples:

<http://onlinestatbook.com/2/index.html>
<http://davidmlane.com/hyperstat/>
<http://vassarstats.net/textbook/>
<http://www.jerrydallal.com/LHSP/LHSP.htm>
<http://www.sportsci.org/resource/stats/>

2. Calculator

You will need a calculator for this class. It should be able to take square roots and natural logs ($\ln x$). It does not need to be fancier than that and it should not cost more than about \$25.

3. Lecture Notes

My lecture notes will be available on the course web site at least a few days prior to each lecture. Beyond this, the worksheets that will be distributed at the beginning of class each day contain a page of notes about what I think are that lecture's most important points.

4. Incompletes

Taking an "Incomplete" in the course is a major hassle for everyone involved. Students are expected to do everything in their power to avoid this situation. Legitimate reasons for taking an "Incomplete" include verified illnesses and extremely serious family emergencies---but only if they happen late in the semester and to students who were otherwise making good progress in the course. In any case, no incompletes will be given unless students have a prior written agreement with me.

5. Decorum

Students are expected to respect one another, the course instructor, and the TAs. This means arriving on time to lectures and labs (or else entering quietly and discretely after class starts). This means not using phones or laptops in a way that distracts others who need to concentrate (perhaps by sitting in the back). It means making sure that email and other communications with the instructor or TAs are civil and professional.

6. Disabilities

I am happy to work with the Office of Disability Services (<http://ds.umn.edu/>) to accommodate the needs of students with any form of disability.

7. Scholastic Dishonesty

I take issues of academic integrity and scholastic dishonesty extremely seriously, and will report every violation of the Student Conduct Code to the department and University. No exceptions.

Grading Rubric for Problem Sets and STATA Assignments

Each problem set or assignment that is turned in on time is worth 20 points. Your score on each problem set or assignment will be a function of ① the effort you demonstrate in attempting to answer the questions (regardless of your understanding of the material or the accuracy of your answers); ② your demonstrated understanding of the materials covered by the questions (regardless of the effort you put forth or the accuracy of your answers); and ③ the completeness and accuracy of your answers (regardless of the effort you put forth or how well you understand the material). Specifically, scores will be assigned as follows:

Demonstrated Effort (Anywhere from 0 to 5 points may be awarded)

5.00 Points	=	You made a serious effort to answer every problem
3.75 Points	=	You made a serious effort to answer most of the problems, but you made less of an effort to answer a few of them
2.50 Points	=	You made a good effort to answer several problems, but you made much less of an effort on several others
1.25 Points	=	You made a good effort to answer a few of the problems, but you made little or no effort to answer most others
0.00 Points	=	You made little or no effort to answer the assigned problems

Demonstrated Understanding of Material (Anywhere from 0 to 5 points may be awarded)

Based on your answers to the problems...

5.00 Points	=	...you clearly understand nearly all of the material covered (regardless of whether the answers are correct)
3.75 Points	=	...you understand most of the material covered, but it is clear that there are some important things that you do not understand
2.50 Points	=	...you understand some of the material covered, but there is just about as much that you do not understand
1.25 Points	=	...you understand a few important parts of the material covered, but you do not understand most of the rest of the material
0.00 Points	=	...you understand very little of the material covered

Grading Rubric for Problem Sets and STATA Assignments (Continued)

Completeness of Answers (Anywhere from 0 to 5 points may be awarded)

5.00 Points	=	You completely and clearly addressed each part of every problem
3.75 Points	=	You completely and clearly addressed most of the problems, but in a few cases it is not clear how you arrived at your answer; you provide some answer to every part of every problem
2.50 Points	=	Your answers are sometimes fairly complete and clear, but about as often it is not obvious how you came to your answer; on some occasions you may not have even addressed parts of problems
1.25 Points	=	Your answers to a few problems are complete and clear, but in most cases it is not obvious how you arrived at your answer; you may not have even addressed some problems
0.00 Points	=	Answers to problems, if provided at all, are usually so incomplete that it is difficult to evaluate their accuracy

Be sure to ask (preferably in lecture or in lab) how to answer particular problems “completely” (that is, how much work to show, how many steps of the mathematical procedures to show, whether you should provide the formulas you use, etc.).

Accuracy of Answers (Anywhere from 0 to 5 points may be awarded)

5.00 Points	=	With the exception of a few minor errors (e.g., a syntax typo or an arithmetic mistake), your answers are nearly all correct
3.75 Points	=	Most of your answers are correct, but some are incorrect (beyond typos or arithmetic errors); or, your answers were mostly correct except that you made several typos or arithmetic errors
2.50 Points	=	Many of your answers are correct, but about an equal number are incorrect
1.25 Points	=	Some of your answers are correct, but most are incorrect
0.00 Points	=	Very few, if any, of your answers are correct

Answer keys to problem sets will be distributed when problem sets are returned to you so that you can compare your answers to mine. In most cases, you will know whether or not your STATA syntax is correct based on whether it generates errors and based on whether it produces sensible results. We will, however, make notes on your problem sets and STATA assignments to indicate which answers are incorrect and where in your answer your reasoning or your mathematics (or whatever) appears to have gone wrong.

Detailed Schedule and Topics to Be Covered

Week 1 – January 20

Tuesday's Lecture

Topic: Course Introduction; Data and Data Analysis; Graphical Representations of Distributions

Due: Worksheet #1

Thursday's Lab --- Cancelled This Week

Week 2 – January 27

Tuesday's Lecture

Topic: Numeric Representations of Distributions; Introduction to STATA; Summarizing Distributions in STATA; In-Class Exercise

Due: Worksheet #2

Thursday's Lab

Topic: Lab Introduction; Review Material from 1/20 and 1/27 Lectures; Prepare for STATA Assignment #1

Due: Nothing

Week 3 – February 3

Tuesday's Lecture

Topic: Percentiles; Standardized Scores; Summarizing Distributions; Sampling; Probability

Due: Worksheet #3

Thursday's Lab

Topic: Review Material from 2/3 Lecture; Problem Set #1 Reviewed; Review for Exam #1

Due: Problem Set #1; STATA Assignment #1

Week 4 – February 10

Tuesday's Lecture

Topic: Discrete Random Variables; Continuous Random Variables

Due: Worksheet #4

Thursday's Lab

Topic: Exam #1; Problem Set #1 Returned

Due: Problem Set #2

Week 5 – February 17

Tuesday's Lecture

Topic: Sampling Distributions; Confidence Intervals

Due: Worksheet #5

Thursday's Lab

Topic: Review Material from 2/10 and 2/17 Lectures; Problem Sets #2 and #3 Reviewed; Problem Set #2 Returned; Exam #1 Returned and Reviewed

Due: Problem Set #3

Week 6 – February 24

Tuesday's Lecture

Topic: Hypothesis Testing

Due: Worksheet #6

Thursday's Lab

Topic: Review Material from 2/24 Lecture; Problem Set #3 Returned; Problem Set #4 Reviewed; Prepare for STATA Assignment #2

Due: Problem Set #4

Week 7 – March 3

Tuesday's Lecture

Topic: In-Class Exercise & Review

Due: Nothing

Thursday's Lab

Topic: Review for Exam #2; Problem Set #4 Returned; Problem Set #5 Reviewed

Due: Problem Set #5; STATA Assignment #2

Week 8 – March 10

Tuesday's Lecture

Topic: Exam #2

Due: Nothing

Thursday's Lab --- Cancelled This Week

Week 9 – March 17 --- SPRING BREAK

Week 10 – March 24

Tuesday's Lecture

Topic: Analysis of Variance; Associations between Categorical Variables x 2

Due: Worksheet #7

Thursday's Lab

Topic: Review Material from 3/24 Lecture; Problem Set #5 Returned; Exam #2 Returned and Reviewed

Due: Nothing

Week 11 – March 31

Tuesday's Lecture

Topic: Associations Between Continuous Variables x 2

Due: Worksheet #8

Thursday's Lab

Topic: Review Material from 3/31 Lecture; Problem Set #6 Reviewed; Prepare for STATA Assignment #3

Due: Problem Set #6

Week 12 – April 7

Tuesday's Lecture

Topic: In-Class Exercise & Review

Due: Nothing

Thursday's Lab

Topic: Exam #3; Problem Set #6 Returned

Due: Problem Set #7; STATA Assignment #3

Week 13 – April 14

Tuesday's Lecture

Topic: *Causal Inference and Observational Data; Two-Way ANOVA and Three-Variable Relationships*

Due: Worksheet #9

Thursday's Lab

Topic: Review Material from 4/14 Lecture; Problem Set #7 Returned and Reviewed; Exam #3 Returned and Reviewed; Prepare for STATA Assignment #4

Due: Nothing

Week 14 – April 21

Tuesday's Lecture

Topic: *Three-Variable Relationships and Multiple Regression; Multiple Regression*

Due: Worksheet #10

Thursday's Lab

Topic: Review Material from 4/21 Lecture; Problem Set #8 Reviewed

Due: Problem Set #8; STATA Assignment #4

Week 15 – April 28

Tuesday's Lecture

Topic: *Multiple Regression Assumptions; Regression Diagnostics; Reading Regression Results*

Due: Worksheet #11

Thursday's Lab

Topic: Review Material from 4/28 Lecture; Problem Set #8 Returned; Problem Set #9 Reviewed

Due: Problem Set #9

Week 16 – May 5

Tuesday's Lecture

Topic: *Categorical Data Analysis; In-Class Exercise & Review*

Due: Worksheet #12

Thursday's Lab

Topic: Exam #4; Problem Set #9 Returned

Due: Nothing

Formulas

1. Mean

$$\bar{x} = \frac{\sum x_i}{n}$$

2. Variance

$$s^2 = \frac{\sum (x - \bar{x})^2}{n - 1}$$

3. Standard Deviation

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

4. Conservative Margin of Error

$$\text{Margin of error} = \frac{1}{\sqrt{n}}$$

5. z-Score

$$z = \frac{x - \bar{x}}{s_x}$$

6. Index of Qualitative Variation (IQV)

$$\text{IQV} = \frac{K}{K-1} (D) \quad \text{where} \quad D = 1 - \sum_{i=1}^K p_i^2$$

7. Expected Value of a Discrete Random Variable

$$E(X) = \mu = \sum x_k p_k$$

8. Standard Deviation of a Discrete Random Variable

$$\sqrt{V(X)} = \sigma = \sqrt{\sum (x_i - \mu)^2 p_i}$$

9. Probabilities for Binomial Random Variables

$$P(X = k) = \frac{n!}{k!(n-k)!} p^k (1-p)^{n-k}$$

10. Expected Value of a Binomial Random Variable

$$E(X) = \mu = np$$

11. Standard Deviation of a Binomial Random Variable

$$\sigma = \sqrt{\sigma^2} = \sqrt{np(1-p)}$$

12. Standard Error for the Sampling Distribution of p -Hat

$$s.e.(\hat{p}) = \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

13. Standard Error for the Sampling Distribution of x -Bar

$$s.e.(\bar{x}) = \frac{s}{\sqrt{n}}$$

14. Standard Error for the Sampling Distribution of p -Hat₁ - p -Hat₂

$$s.e.(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}$$

15. Standard Error for the Sampling Distribution of x -Bar₁ - x -Bar₂

$$s.e.(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

16. Confidence Interval for Proportions

$$\hat{p} \pm z^* \times \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

17. Confidence Interval for Means

$$\bar{x} \pm t^* \frac{s}{\sqrt{n}}$$

18. Confidence Interval for Differences in Proportions

$$\hat{p}_1 - \hat{p}_2 \pm z^* \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}$$

19. Confidence Interval for Differences in Means

$$\bar{x}_1 - \bar{x}_2 \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

20. Test Statistic for Hypothesis Tests about Proportions

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1 - p_0)}{n}}}$$

21. Test Statistic for Hypothesis Tests about Means

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

22. Test Statistic for Hypothesis Tests about Differences In Proportions

$$z = \frac{\hat{p}_1 - \hat{p}_2 - 0}{\sqrt{\frac{\hat{p}(1-\hat{p})}{n_1} + \frac{\hat{p}(1-\hat{p})}{n_2}}}$$

where...

$$\hat{p} = \frac{n_1\hat{p}_1 + n_2\hat{p}_2}{n_1 + n_2}$$

23. Test Statistic for Hypothesis Tests about Differences in Means

$$t = \frac{\bar{x}_1 - \bar{x}_2 - 0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

24. Test Statistic for Hypothesis Tests about Multiple Group Means

$$F = \frac{MS \text{ Groups}}{MSE}$$

where...

$$MS \text{ Groups} = \frac{SS \text{ Groups}}{k - 1} \quad (\text{and } SS \text{ Groups} = n_1(\bar{y}_1 - \bar{y})^2 + n_2(\bar{y}_2 - \bar{y})^2 + \dots + n_k(\bar{y}_k - \bar{y})^2)$$

and...

$$MSE = \frac{SS \text{ Error}}{N - k} \quad (\text{and } SS \text{ Error} = (n_1 - 1)s_1^2 + (n_2 - 1)s_2^2 + \dots + (n_k - 1)s_k^2)$$

25. Chi-Squared (χ^2)

$$\chi^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$$

$$\text{Expected Value} = \frac{\text{row total} \times \text{column total}}{\text{total number of cases in table}}$$

26. Correlation

$$r = \frac{1}{n-1} \sum_i \left(\frac{x_i - \bar{x}}{s_x} \right) \left(\frac{y_i - \bar{y}}{s_y} \right)$$

27. Regression

$$\text{Regression Line : } \hat{y} = b_0 + b_1x$$

$$b_1 = r \left(\frac{s_y}{s_x} \right)$$

$$b_0 = \bar{y} - b_1\bar{x}$$

28. Standard Deviation for Regression

$$s = \sqrt{\frac{SSE}{n-2}} = \sqrt{\frac{\sum (y_i - \hat{y}_i)^2}{n-2}}$$

29. Standard Error for Regression Slope

$$s.e.(b_1) = \frac{s}{\sqrt{\sum (x_i - \bar{x})^2}}$$

30. Confidence Interval for Regression Slope

$$b_1 \pm t^* s.e.(b_1)$$

31. Test Statistic for Hypothesis Tests about Regression Slope

$$t = \frac{\text{sample statistic} - \text{null value}}{\text{standard error}} = \frac{b_1 - 0}{s.e.(b_1)}$$

32. Standard Error of Predicted Values

$$s.e.(fit) = s \sqrt{\frac{1}{n} + \frac{(x - \bar{x})^2}{\sum (x_i - \bar{x})^2}}$$

33. Confidence Interval for Individual Predicted Values

$$\hat{y} \pm t^* \sqrt{s^2 + [s.e.(fit)]^2}$$

34. Confidence Interval for the Mean of y at a Given x

$$\hat{y} \pm t^* \times s.e.(fit)$$

COLLEGE OF LIBERAL ARTS POLICY

GRADES: University academic achievement is graded under two systems: A-F (with pluses and minuses) and S-N. Choice of grading system and course level (1xxx/3xxx/4xxx) is indicated on the registration website; changes in grade scale may not be made after the second week of the semester. Some courses may be taken under only one system; limitations are identified in the course listings. The Department of Sociology requires A-F registration in courses required for the major/minor. University regulations prescribe the grades that will be reported on your transcript.

- A Represents achievement that is outstanding relative to the level necessary to meet course requirements (4.00 grade points)
- A- 3.67 grade points
- B+ 3.33 grade points
- B Achievement significantly above the level necessary to meet course requirements (3.00 grade points)
- B- 2.67 grade points
- C+ 2.33 grade points
- C Achievement that meets the basic course requirements in every respect (2.00 grade points)
- C- 1.67 grade points
- D+ 1.33 grade points
- D Achievement worthy of credit even though it fails to meet fully the course requirements (1.00 grade point)
- F Performance that fails to meet the basic course requirements (0 grade points)
- S Represents achievement that is satisfactory, which is equivalent to a C- or better.**
- N No credit. Its use is now restricted to students not earning an S on the S-N grade base
- I Incomplete, a temporary symbol assigned when the instructor has a "reasonable expectation" that you 1) can successfully complete unfinished work on your own no later than one year from the last day of classes and 2) believes that legitimate reasons exist to justify extending the deadline for course completion. The instructor may set date conditions for make-up work. If a course is not completed as prescribed or not made up as agreed within the year, the I will lapse to an F if registered on the A-F grade base or an N if registered on the S-N grade base.
- W Official withdrawal from a course after the end of the second week of the semester. You must file a course cancellation request before the end of the sixth week of the semester to ensure that the W, rather than the F, will be formerly entered on your record.

FINAL EXAMINATIONS (see schedule on the Calendar web site at <http://onestop.umn.edu/onestop/Calendars/FinalExams.html>): You are required to take final examinations at the scheduled times. Under certain circumstances, however, you may request final examination schedule adjustment in your college office. Instructors are obligated to schedule make-up examinations within the final examination period for students who have three final examinations within a 16-hour period. Instructors also are encouraged to reschedule examinations for students with religious objections to taking an examination on a given day. You must submit your request for an adjustment in your schedule at least two weeks before the examination period begins. For assistance in resolving conflicts, call the CLA Student Information Office at 625-2020. If you miss a final, an F or N is recorded. You must obtain the instructor's permission to make up the examination. Final examinations may be rescheduled by the instructor only through the official procedure for that purpose (as noted on the above web page). Final examinations may not be scheduled for the last day of class or earlier or for Study Day. If an examination is rescheduled at the instructor's request, and you have an examination conflict because of it, you are entitled to be given the final examination at an alternative time within the regularly scheduled examination period for that semester.

CLASS ATTENDANCE: As a CLA student, you are responsible for attending class and for ascertaining the particular attendance requirements for each class or department. You should also learn each instructor's policies concerning make-up of work for absences. Instructors and students may consult the CLA Classroom, Grading, and Examination Procedures Handbook for more information on these policies (<http://advisingtools.class.umn.edu/cgep/>).

COURSE PERFORMANCE AND GRADING: Instructors establish ground rules for their courses in conformity with their department policies and are expected to explain them at the first course meeting. This includes announcement of office hours and location, the kind of help to be expected from the instructor and teaching assistants, and tutorial services, if available. The instructor also describes the general nature of the course, the work expected, dates for examinations and paper submissions, and expectations for classroom participation and attendance. Instructors determine the standards for grading in their classes and will describe expectations, methods of evaluation, and factors that enter into grade determination. The special conditions under which an incomplete (I) might be awarded also should be established. The college does not permit you to submit extra work to raise your grade unless all students in the class are afforded the same opportunity.

CLASSROOM BEHAVIOR: You are entitled to a good learning environment in the classroom. Students whose behavior is disruptive either to the instructor or to other students will be asked to leave (the policies regarding student conduct are outlined in the CLA Classroom, Grading, and Examination Procedures on-line at <http://advisingtools.class.umn.edu/cgep/>).

ELECTRONIC DEVICES: University instructors may restrict or prohibit the use of personal electronic devices in his or her classroom, lab, or any other instructional setting. For the complete policy, visit: <http://www.policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>

SCHOLASTIC CONDUCT: The University Student Conduct Code defines scholastic dishonesty as follows:

Scholastic Dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. Students cannot evade (intentionally or unintentionally) a grade sanction by withdrawing from a course before or after the misconduct charge is reported. This also applies to late withdrawals, including discretionary late cancellation (also known as the "one-time-only drop"). For the complete policy, visit: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf

STUDENT MENTAL HEALTH AND STRESS MANAGEMENT: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via <http://www.mentalhealth.umn.edu/>.

A REMINDER OF RELEVANT POLICIES AND PROCEDURES
*** SOCIOLOGY DEPARTMENT POLICIES ***

GRADE INFORMATION: Grades are due in the Office the Registrar within 3 business days after the final examination. No information regarding grades will be released by the department office staff to anyone except designated personnel in Records and college offices. Students may access their own grades through their computer account. They may do this by following the directions on the One Stop web site at <http://onestop.umn.edu/>.

INCOMPLETES: It is the instructor's responsibility to specify conditions under which an Incomplete (I) grade is assigned. Students should refer to the course syllabus and talk with the instructor as early as possible if they anticipate not completing the course work. Coursework submitted after the final examination will generally be evaluated down unless prior arrangements are made in writing by the instructor. University policy states that if completion of the work requires the student to attend class in substantial part a second time, assigning an "I" grade is NOT appropriate. Incompletes are appropriate only if the student can make up the coursework independently with the same professor.

MAKE-UP EXAMINATIONS: Arrangements for special examinations must be made directly with the instructor who taught the course and who is responsible for approving and supervising the examination or making individual arrangements. Circumstances for missing an exam include, but are not necessarily limited to: verified illness, participation in athletic events or other group activities sponsored by the University, serious family emergencies, subpoenas, jury duty, military service, and religious observances. It is the responsibility of the student to notify faculty members of such circumstances as far in advance as possible.

GRADE CHANGES: Grades properly arrived at are not subject to renegotiation unless all students in the class have similar opportunities. Students have the right to check for possible clerical errors in the assignment of grades by checking with the instructor and/or teaching assistant.

Students with justifiable complaints about grades or classroom procedures have recourse through well-established grievance procedures. You are expected to confer first with the course instructor. If no satisfactory solution is reached, the complaint should be presented in writing to the department Director of Undergraduate Studies or the Coordinator of Undergraduate Advising (909 Soc Sci). If these informal processes fail to reach a satisfactory resolution, other formal procedures for hearing and appeal can be invoked. See the departmental advisor in 923 Social Sciences to explore options.

DISABILITY SERVICES: Students with disabilities that affect their ability to participate fully in class or to meet all course requirements are encouraged to bring this to the attention of the instructor so that appropriate accommodations can be arranged. For more info contact Disabilities Services in 230 McNamara.

SEXUAL HARASSMENT: University policy prohibits sexual harassment as defined in the December 1998 policy statement, available at the Office of Equal Opportunity and Affirmative Action. Questions or concerns about sexual harassment should be directed to this office in 419 Morrill Hall.

SOCIOLOGY PROGRAMS INFORMATION: The Sociology Department offers two options for the Bachelor of Arts degree and a Bachelor of Science degree. We also have an Honors Program. Students interested in majoring in Sociology should view the online-information session about the major. Further information can be obtained from the following persons and offices or online at <http://www.soc.umn.edu/undergrad/>
General information, Sociology Department, 909 Social Sciences - 624-4300
Coordinator of Undergraduate Advising, Bobby Bryant, 923 Social Sciences – 624-4300
Director of Undergraduate Studies, Professor Teresa Swartz, 933 Social Sciences – 626-1862
Sociology Honors Advisor, Professor Kathleen Hull, 1131 Social Sciences - 624-4339
Director of Graduate Studies, Professor Ann Meier, 1074 Social Sciences – 624-9828 and/or
Graduate Program Associate, Becky Drasin, 927 Social Sciences - 624-2093

Undergraduate jobs, internships, volunteer and research opportunities, scholarships, and much more can be found in the Undergraduate Resources site - <http://z.umn.edu/socugrad>

Syllabus Comprehension Page

Please read the syllabus very carefully, read the statement below, fill in the requested information, and deliver this form to class on January 27.

By signing below, I certify that I have:

- 1. Read the entire syllabus for Sociology 3811**
- 2. Discussed with the instructor any aspect of the syllabus that I did not initially understand**
- 3. Agreed to abide by the terms of the syllabus**

Sincerely,

Signature: _____

Print Name: _____

Student ID#: _____