

SOC 210 Introduction to Statistics for Social Science
University of Michigan, Winter 2022

Instructor: Prof. Yun Zhou (zhouyun@umich.edu)

1 COVID-19 Teaching Plans

Given the size and nature of our class (i.e., a large introductory course on statistics), the central objective of Winter 2022 SOC 210 is to ensure the wellbeing of all members of the class, while meeting the core pedagogical goals of a introductory statistics course. This means:

- **Lectures:** Class meets on Tuesday & Thursday 1-2pm in Angell Hall Auditorium D. Lecture Capture has been enabled for our class and **course recordings will be provided** to accommodate asynchronous participation. We follow the university's masking, vaccine, and illness reporting policies. To protect members of our community, **masking is required** for in-person attendance and **attend in-person only when you feel well and safe to do so**. Given the cumulative nature of a statistics course, attending lectures (either synchronously or asynchronously) is crucial.
- **Labs:** Weekly labs are an essential component of SOC 210. Your GSI determines the mode of their own lab(s)—regardless of the mode (e.g., in-person, hybrid, or virtual), your GSI will remain communicative and committed to your success in this course. Extenuating circumstances (e.g., sickness, caring for sick loved ones, etc.) aside, **synchronous participation in labs is expected**. Your lab participation counts toward your final grade. More details in the *Requirements and Assessments* section below.
- **Wellbeing:** COVID has brought many unique challenges to members of our class and community. Please reach out to me and/or your GSIs if you have any questions and concerns. As the semester proceeds, we may need to adapt and adjust accordingly.

2 Course Description & Learning Objectives

Statistics gives you the power to understand the social world through systematically using the information at hand. It is the **science of collecting, summarizing, and analyzing data**.

In this course, you will:

- Learn the basic concepts and techniques of quantitative data analysis
- Practice presenting and communicating your findings to others
- Develop some basic statistical computing skills
- Advance your “quantitative literacy,” and become a more critical and informed consumer of the statistical claims made in research, media, and politics

This course requires no prior knowledge of math beyond basic algebra nor previous statistical computing experience. **You do not need to be a “math person” to enjoy or do well in this class.** Rather, I hope you will walk away from SOC 210 with the confidence that quantitative data analysis is accessible.

3 How to Excel in SOC 210

- This is a statistics course, so everything is **cumulative**. It is essential that you keep up with the course material.
- This means consistently coming to lectures and labs prepared, keeping up with homework assignments, and completing the assigned readings carefully.
- **Don’t be afraid to ask questions in lectures and in labs.** If something is unclear to you, it is probably unclear to others as well. Lectures and labs are planned to allow time for questions and answers.
- Learning statistics is somewhat like learning a new language and for some, there may be a steep learning curve. Don’t get discouraged if it takes some time to “get it,” or when you make mistakes. Embrace new concepts and symbols.
- **Practice, practice, practice** (in lectures, in labs, with problem sets).
- Lecture slides will be made available immediately on Canvas before each lecture to facilitate note taking. Yet they are not a substitute for attending lectures.
- If you find yourself falling behind, seek help immediately from me and your GSIs—we are here to support your learning process.

4 Course Material

We will not have any one required textbook for this class. Below are some options—each with its own strengths and may suit different needs:

1. Statistical Methods for the Social Sciences, 4th Edition by Agresti & Finlay

This is an elementary statistics textbook. It is a good book if you are looking for clarifications on different concepts. You can buy or rent it cheaply from Amazon.com or Abebooks.com.

2. OpenIntro Statistics

Another introductory textbook. This book focuses more on data analysis and visualization. Also, it is freely available here: <https://www.openintro.org/stat/textbook.php>

3. Naked Statistics by Charles Wheelan

This is a fun book written in accessible language. We will read some chapters from it together as a class as well.

4. The Statistical Sleuth, by Ramsey & Schafer

This is a good book if you are looking for something more advanced, particularly in the second half of the semester when we talk about regressions.

5 Requirements and Assessments

5.1 Lecture attendance and participation

Class meets in-person on Tuesday & Thursday 1-2pm in Angell Hall Auditorium D. Recordings will be made available after each lecture to ensure asynchronous participation. It is important that you keep up with the lecture (either through in-person attendance or recordings) each week.

5.2 Lab attendance and participation (15%)

Lab is a space for getting questions answered and practicing the concepts and methods learnt in class. We encourage you to actively ask and answer questions in labs. Don't be afraid of making mistakes! If you answer a question incorrectly, it is an excellent learning opportunity for both you and the other students.

Your GSI will record attendance for each lab. There are 11 lab sessions this semester. Extenuating circumstances (e.g., sickness, caring for sick loved ones, etc.) aside, **synchronous participation in labs is required**. If you must miss a lab session, please provide your GSI with an explanation in writing and proper documentations. Each **unexcused** lab absence will cost you 1.5 pts. **One unexcused “no-questions-asked” lab absence is allowed**. This means that you only start losing attendance points if you have two or more unexcused absence.

5.3 Problem sets (40%)

There will be **ten** take-home problem sets, which should be submitted directly on Canvas. Problem sets are due by **Friday 11:59pm** the week after it is assigned. All problem sets will be graded, but only **eight** out of the ten with the highest grades will count toward your final course grade with equal weight. This means that if you do not do well on one particular problem set, there will be a second chance. **Because of this flexibility, no late submission will be accepted.** You are encouraged to discuss with your peers when working through a problem set, however, your submitted work must be your own—this means writing your own answers. For a course like this where the material is cumulative, it is crucial to keep up with problem sets.

P-sets due dates: By 11:59pm, 1/21, 1/28, 2/4, 2/11, 2/25, 3/11, 3/18, 4/1, 4/8, 4/22

5.4 In-class exams (45%)

There will be **three** in-class exams. The one with the highest grade will account for 20% of your final course grade, the one with the second-best grade will account for 15%, and your lowest grade exam will account for 10%. Again, this means that if you do not do well on one particular exam, there will be a second chance to turn things around.

First exam date: 2/10

Second exam date: 3/17

First exam date: 4/19

6 Grade Composition and Conversion

Participation $10 \times 1.5\% = 15\%$

Problem-sets $8 \times 5\% = 40\%$

In-class exams $10\% + 15\% + 20\% = 45\%$

Letter grade conversion:

A+	95% and above	A	92-94%	A-	88-91%
B+	85-87%	B	81-84%	B-	78-80%
C+	75-77%	C	71-74%	C-	68-70%
D+	65-67%	D	61-64%	D-	58-60%
E	55-57%	F	56% and below		

7 Make-up and Regrading Policies

Your two lowest problem set grades will be dropped, and your lower in-class exam grades will be down-weighted, one unexcused lab absence is allowed. Given such flexibility, **there will be no make-up for exams, problem sets, and labs.**

If officially excused in advance, the following policies apply: Problem set will be extended for 48 hours. You will receive the participation credit for the excused lab.

Advanced excused absences are not accepted for in-class exams. In extenuating circumstances when you need to miss an exam, please come talk to me and we will work out other arrangements.

Re-grading requests need to be made within one week of when the assignment is returned. You need to submit the request in writing, including the reasons you feel your grade should be changed as well as your graded assignment or exam. Requests will be honored if points were tallied incorrectly or if your answer was marked incorrectly. We will not re-grade to alter the number of points deducted for a mistake. Upon submission for re-grading, your entire assignment or exam will be reviewed and contested grades may be lowered.

8 Support, Resources, and Inclusive Learning

8.1 Office hours

Office hours offer a great space to build intellectual connections and get support. Both your GSIs and I love to see you come to office hours.

For appointments with me, please sign-up using the link on our Canvas site. (I will make the best effort to accommodate all students, but my week-to-week availability may vary slightly.)

GSI office hour: You are welcome at any GSI's regular office hours, regardless of your lab assignment.

8.2 Navigating challenges during the semester

Coming to class prepared and completing the assignments on time is integral to the learning process. We all have different obligations and responsibilities—beyond taking or teaching any one class—during the semester: By having and meeting deadlines, we learn the skills of managing priorities and time. Of course, emergencies and challenges do happen. Therefore, some of the course components have flexibility built in (e.g., limited number of allowed clicker and lab absences; two lowest problem set grades will be dropped, etc.), others have firm dates and deadlines (e.g., the in-class exams). If you are

experiencing any difficulties and challenges during the semester, please come talk to me and we will work out a game plan together.

8.3 Inclusive learning

The university and I are committed to fully include all students.

Services for Students with Disabilities (SSD) can provide support services and academic accommodations to students with disabilities. Please inform me and contact SSD as soon as possible (<https://ssd.umich.edu/topic/our-services>) to request any accommodations.

If religious observances conflict with any course activities, please let me know early in the semester.

Additional resources on inclusive teaching can be found here:

<https://sites.lsa.umich.edu/inclusive-teaching/home/campus-resources-2/>

Please reach out to me if you need support and resources.

9 Course Schedule

(Subject to revision, depending on how quickly we move through the material)

Week 1 Welcome

1/6 Introduction to the course and to each other

No lab this week

Week 2 It All Starts with Data

1/11 Basic concepts, types of variables and their measurements

1/13 Data collection basics

Lab 1: Data exploration

P-set 1

Week 3 Summarizing Data: Center and Variability

1/18 Frequency distribution, center, and outlier

1/20 Variability

Lab 2: Center and variability practice

P-set 2

P-set 1 due by 1/21 11:59pm

Week 4 Probability I

1/25 Introduction to probability: Basic probability rules

1/27 Random variables and useful probability distributions

Lab 3: Probability rules practice; Probability density function practice

P-set 3

P-set 2 due by 1/28 11:59pm

Week 5 Probability II

2/1 The normal distribution

2/3 Sampling distributions

Lab 4: Sampling distributions practice; Review session for exam I

P-set 4

P-set 3 due by 2/4 11:59pm

Week 6 In-class Exam I

2/8 Review Session for Exam I

2/10 In-class Exam I

No lab this week

P-set 4 due by 2/11 11:59pm

Week 7 Making Inference

2/15 The t-distribution and confidence interval

2/17 Confidence interval continued

Lab 5: Confidence interval practice

P-set 5

Week 8 Hypothesis Testing: Basic Concept and Component

2/22 The five parts of a significance test

2/24 Significance test of the mean

Lab 6: Hypothesis testing practice

P-set 6

P-set 5 due by 2/25 11:59pm

SPRING BREAK—NO CLASSES

Week 9 Making Comparisons

3/8 Understanding p-value

3/10 Understanding decision errors

Lab 7: Hypothesis testing practice; Review session for Exam II

P-set 7

P-set 6 due by 3/11 11:59pm

Week 10 In-class Exam II

3/15 Review Session for Exam II

3/17 In-class exam II

No lab this week

P-set 7 due by 3/18 11:59pm

Week 11 Understanding Association

3/22 Additional exploration of significance testing

3/24 χ^2 distribution and χ^2 test

Lab 8: χ^2 test practice

P-set 8

Week 12 Simple Linear Regression I

3/29 Introduction to simple linear regression

3/31 Simple linear regression: Assumption

Lab 9: Regression assumption practice

P-set 9

P-set 8 due by 4/1 11:59pm

Week 13 Simple Linear Regression II

4/5 Understanding regression results

4/7 No class—Take home regression practice

Lab 10: Regression interpretation practice

P-set 9 due by 4/8 11:59pm

Week 14 Regression Wrap-up

4/12 Regression diagnostics

4/14 Review for Exam III

Lab 11: Review session for Exam III

P-set 10

Week 15 In-class Exam III

4/19 In-class exam III

No lab this week

P-set 10 due by 4/22 11:59pm