

SOC/ANTHRO 10B (on-line): PROBABILITY AND STATISTICS II

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1. COURSE DESCRIPTION

Welcome to Stats 10B! This is the second course of a three-part series in statistical methods for quantitative social science research.

Why study statistics? Statistics is the science and, arguably, the art of learning from data. As a discipline it is concerned with the collection, analysis and interpretation of data, as well as the effective communication and presentation of results from data analyses. Within the social sciences, a quick glance through recent issues of journals such as the *American Sociological Review* and *American Political Science Review* reveals the fundamental role of statistics in research. For example, upon collection and statistical analysis of educational data, we can better understand what socioeconomic factors (e.g., race, class, sex, region, etc.) have the greatest impact on a student's academic performance, and life outcomes in general. This class is designed to encourage students to engage with quantitative concepts, methods and theories to critically evaluate these types of social, cultural, political and economic phenomena. Topics will cover chapters 5 -7 from the *Agresti* textbook and will focus on concepts such as but not limited to a) univariate and bivariate distributions, including probability and the normal curve; b) measures of central tendency, variation/dispersion, and confidence intervals; and c) comparing means and proportions for two groups.

1.1 Course Objectives

By the end of the course, you should be able to...

- ⇒ Gain a better understanding of quantitative methods for social science research
- ⇒ Conduct hypothesis testing
- ⇒ Interpret and communicate statistical results correctly and accurately and to clearly communicate statistical conclusion

1.2 Prerequisites

ANTHRO / ECON / PSYCH / SOC SCI / SOCIOL 10A

As being part of an introductory statistics course series, it assumes that your only prior coursework in statistics

was only 10A. Meaning, the required level of math knowledge still remains quite low, so you should not worry if you haven't done well in math classes in the past or if you struggled in 10A. What's much more important for success in 10B is not prior course success, but good old-fashioned hard work, consistent effort, and determination focused on the present moment. You shouldn't think doing well in prior classes will provide much of an advantage; likewise, you should not think that not doing well in previous classes will be much of an obstacle.

1.3 Course Text and Online Resources

Textbook (same from 10A):

Agresti, Alan, and Barbara Finlay. *Statistical Methods for the Social Sciences, 5th ed.* New Jersey, Prentice Hall. The book looks like [this](#).

Note: You need the 5th edition. Earlier editions are not permitted.

Calculator

You will need a basic calculator that can do basic functions (including add, subtract, multiply, divide, and square root). It does not need to be a graphing calculator.

1.4 Zoom and Privacy

As with 10A, the course lectures and labs will be conducted over Zoom. As the instructor, I will be recording this session. I have disabled the recording feature for others so that no one else will be able to record this session. I will be posting this session to the course's website at [insert website]. If you have privacy concerns and do not wish to appear in the recording, you may turn video off (click "stop video") so that Zoom does not record you. If, when you disable live video, you also want to use a profile image (other than a picture of you) instead of your name, please let me know which image you will be using so that I know who you are during the session. If you would like to ask a question, you may do so privately through the Zoom chat by addressing your chat question to me only (and not to "everyone"), or you may contact me by another private method. If you have questions or concerns about this, please contact me.

1.5 Organization of the course

This course will be administered through an asynchronous online structure. This means that you will be able to access the course materials on your own time, rather than needing to all convene at the regularly scheduled course time. This structure should allow more flexibility with respect to access to technology, caregiving responsibilities, time zone differences, etc.

This 5-week course is divided into 10 units, with 2 units scheduled for each of the five weeks of the class.

- ⇒ Week 1: Units 1 & 2
- ⇒ Week 2: Units 3 & 4
- ⇒ Week 3: Units 5 & 6
- ⇒ Week 4: Units 7 & 8
- ⇒ Week 5: Units 9 & 10

Each unit (except unit 1) has a series of pre-recorded lecture videos that provide an overview of the unit and orients students to the major topics, themes and foci of that unit.

- a) Learning objectives handout
- b) Unit quiz and detailed solutions
- c) Video quiz
- d) Practice problems and detailed solutions

The exception is unit 1, which does not include a problem set.

- a) The **learning objective handout** provides a broad overview of the unit and is designed to help you zero in on the “big picture” of each unit. They also include diagnostic questions that should help you assess your grasp of the material in that unit. Use them to check your knowledge.
- b) The **unit quizzes** are graded, but only on the basis of full completion (i.e., all questions/problems must be answered). Thus, you need to complete the unit quiz and turn it in to receive credit. As long what you’ve turned in reflects a good faith attempt to successfully complete the quiz, you will receive 100% of the points. The work you submit for the quizzes must reflect your own work, and only your own work. If you turn in gibberish or an incomplete quiz you will receive zero points for that unit quiz. The unit quizzes purposely designed to be more challenging than the video quizzes and practice problems. **Note that you will need access to a scanner or a camera to turn in electronic versions of your unit quizzes. Usually, a cell phone camera will suffice. The key consideration is that we can read what you submit. If we cannot read what you submit, we cannot give you credit for the work and no make-up assignments will be permitted.**
- c) Each week there will be **video quizzes** that are graded, but only on the basis of completion. These review and quiz videos are the only pre-recorded lectures required to watch in order to receive credit. There will be ten (10) video quizzes this quarter and are graded based on completion. They must be completed by **11:59pm on Friday (PST)**. Make sure to watch the entire video and complete all questions to receive full credit. These video quizzes are the last video lesson of each unit and either a)

review material for that unit or b) go over practice problems. Note that week 1 ends on Friday, August 7, week 2 ends on Friday, August 14, week 3 ends on Friday, August 21, week 4 ends on August 28, and week 5 ends on Friday, September 4. Please plan accordingly so you can complete and submit the video quiz and other assignments on time.

- d) The **practice problems** provide additional opportunities to master the course material, and usually will require you to work out problems and provide interpretation of the results. They are ungraded and are not required to turn in. It is the student's responsibility to complete them and study the solutions. Take them very seriously and be sure to study the detailed solution sets – *they provide detailed explanations and not just correct numerical answers.*

2. COURSE REQUIREMENTS AND EVALUATION

Grades for this course will be based on...

Exam I	20%
Exam II	25%
Final Exam	30%
Unit quizzes	10%
Video quizzes	10%
Syllabus quiz	3%
Course evaluation	2%

2.1 Examinations

Examinations serve as the instructor's "measuring stick" to gauge how well the students grasped the materials. In this course, there are three examinations – two midterms and a cumulative final exam. Exams I and II are worth 25% each; the cumulative final exam is worth 30% of one's grade.

- Exam I (20% of your grade) covers units 1 – 4 and will be offered online on **Friday, August 14.**
- Exam II (25% of your grade) covers units 5 – 8 and will be offered online on **Friday, August 28.**
- Final Exam (30% of your grade) is cumulative and will be offered online on **Wednesday, September 9.**

All exams will be administered using Canvas Quizzes. Each exam will focus on the third of the course prior to it. I will conduct at least one open Zoom call in which you can ask me questions before each exam.

All exams will be proctored using **Respondus Lockdown Browser** at no cost to the student. **You will need a webcam, access to the Internet, and a quiet, private space in which to take your exams. For each exam, have your student ID ready for identification purposes.** You will have 120 minutes to complete each exam,

and the exam period will be held open for 14 hours, from 8:00am until 10:00pm (Pacific Standard Time), each exam day. This is to provide you with flexibility as to when you take your exam on an exam day. You may begin your exam at any time during that 14-hour period, as long as you are finished with the exam before 10:00pm. However, each exam must be completed within 120 minutes – once you begin an exam, you have 120 minutes from that time to complete your exam. You must work continuously; you cannot begin an exam, stop, and begin working again later. So, for example, if you begin taking an exam at 6:00pm, you must work on it continuously either (a) until you are done, or (b) until 8:00pm, whichever comes first. **This means you should not begin any exam after 8:30pm (Pacific Standard Time) – that will ensure that you will have the full 120-minute exam period in which to complete your exam before the examination window closes exactly at 9:00pm.**

2.1.1 Examinations: Format

All exams are made up of entirely of multiple-choice questions. Some questions will require you to perform calculations and will ask you to choose the closest answer from the possible answers that are provided (to avoid possible ambiguities associated with rounding). Other questions may test your knowledge (among other possibilities) definitions or concepts. Practice examination questions will be provided before each exam to give you a sense of the questions. They of course should be taken as representative of all questions that might appear on an exam. They are provided as a guide.

2.1.2 Examinations: What can I use during an exam?

The exams will *closed-book*. This means that you can refer to your notes as well as the textbook and my PowerPoint slides and lectures. However, you may not under any circumstances consult with each other, nor may you consult sources outside the course materials, such as the Internet, cell phones or other electronic devices during exams or graded quizzes. Doing so would constitute academic dishonesty and automatically receive a failing grade. The Respondus Lockdown Browser will restrict access to other browsers throughout the exam and will turn off immediately upon completing the exam.

Some exceptions are described below. You are allowed the following on exams and quizzes:

- **Note sheet(s):** Students are permitted one note sheet for exam I, one note sheet for exam II, and two note sheets for the final exam. Before preparing for an exam, print the blank note sheet from the course website. You not make your own note sheet. *Your notes must be handwritten and fit inside the box printed on both sides of the note sheet.* Any writing, or evidence of erasing, outside the box on the front of your note sheet will be considered academic dishonesty. As long as you write inside the boxes, you can write whatever you like on your note sheet.

- **Calculator:** You are allowed to use a hand-held calculator on exams and quizzes. However, it cannot be a calculator on your phone, laptop, tablet, or any other electronic device. It must be a hand-held, stand-alone calculator. Using any other device on an exam or quiz will be considered academic dishonesty. It does not have to be a fancy calculator – any basic scientific calculator will do.
- **Statistical tables:** Any statistical tables you might need for an exam will be permitted and will not count against your handwritten notes. Specific instructions regarding statistical tables will be posted prior to each exam.

2.2 Unit quizzes (10% of grade)

There will be five (5) unit quizzes this quarter – one for each week of the course. Each quiz will cover two units, and will most likely have two questions, one questions per unit. Unit quizzes are due **by 11:59pm on Friday (Pacific Standard Time) of each week**. There is a 60-minute “grace period” for late work, as described in section 2.5 below, will be in effect for quizzes.

2.3 Video quizzes (10% of grade)

There will be video quizzes this quarter and are graded based on completion. Video quizzes must be completed by **11:59pm on Friday (PST)**. These video quizzes are the last video lesson of each unit. Each video quiz will either a) review material from that unit or b) provide opportunities to do interactive practice problems with the instructor. Make that you watch the entire video and complete all questions to receive full credit.

2.5 Syllabus quiz (3% of grade)

There will be a syllabus quiz due by the **Friday August 7th at 11:59pm (PST)**. This quiz will cover the information shared in the syllabus and will likely have 10 multiple choice questions.

2.6 Course evaluation (2% of grade)

Each opportunity to teach is an opportunity to improve. Part of your grade will be to complete the departmental course evaluation at the end of the course. This anonymous survey provides opportunities to evaluate the instructor’s teaching performance and offer valuable feedback. I use these evaluations to improve the quality of my teaching.

Policy on Late Work:

To make everyone’s life easier, submit your work on time! Note that the reliance on online platforms increases

the likelihood of last-minute disasters (e.g., unexpected internet/power outage or computer crash) that may prevent you from getting your work done in time. There is a 60-minute “grace period” with each due date. Penalties for work submitted after the grace period will be described in detail on each quiz.

3. GETTING HELP AND COMMUNICATING WITH INSTRUCTOR(S)

Even though it is an on-line course, it’s not a “do it yourself” endeavor. Remember, your professor and TA (if one is assigned to the class) are here to help. We want you to be connected to your instructor and TA. However, it is primarily your responsibility to seek help when you need it. Use the following methods to get in touch and/or ask questions.

- **Discussion board:** There will be a discussion board where students can post questions related to the class material. Discussion postings are archived and will be available throughout the course. *Please do not email the instructor with questions about the readings or video lessons. They should be posted to the discussion forum.* I will do my best to respond quickly to questions. Other questions not related to course material should be posted to the separate forum created for that purpose. In sum, there will be two discussion forums – one specific for questions regarding course content and materials, and another for more general questions about the course.
- **On-line office hours:** Professor Jacinto and the TA (if one is assigned) will hold weekly office hours on-line. More details are forthcoming.

4. ACADEMIC HONESTY

I take academic honesty extremely seriously. The learning environment at the University of California, Irvine (UCI) is based on honesty and integrity. Sustaining this environment requires all participants recognize the importance of maintaining the highest ethical standards. It is critical that all student work be the sole work of each individual student. The exams and quizzes you take in this course are to be done by you and you alone, without assistance. You may not print exams or quizzes, and you are to take them without assistance from other people, the internet, your cell phone, or through any other method one might use to gather information. Doing so constitutes academic dishonesty. Anyone caught cheating or engaged in actions that in any way violate the university policy on academic honesty will receive an F in the course. There are no exceptions to this rule, and I will never look the other way. Remaining in the course assumes that you understand what academic honesty is, in all its varied forms, and pledge not to engage in any type of dishonest conduct (which includes, but is not limited to cheating, plagiarism, and collusion). You, the student, are required to know and understand the relevant policies regarding academic dishonesty. To this end, you are required to carefully read the information found by following the link below. Additionally, all participants in the course are also bound by

the University of California Code of Conduct. The relevant links appear on the Canvas course page. Please carefully review them.

5. ON-LINE COMMUNICATION

5.1 Basic considerations

In an online classroom, we communicate primarily through writing. Although expressing ourselves through writing has many advantages, it also has disadvantages. Of central concern is the possibility for misunderstandings or conveying a tone that you do not intend to convey. This happens because we lack the benefit of having access to one another's body language, facial expressions, tone, and non-verbal gestures. As a result, we need to be aware of the real possibility of miscommunication.

5.2 Specifics for this class

I require that all communication be done in a respectful, courteous, and professional manner. When in doubt, always err in these directions; for example, aim for being slightly more courteous than you may think you need to be. Nobody will object to an extra "please" or "thank you." Always take a few minutes to read what you have written before posting a comment or sending an email – *pause and think* – could what you have written be construed as disrespectful, impolite, or snappy? When in doubt, re-think your words and tone, and re-calibrate your message. We may not always agree but disagreeing while simultaneously showing respect and courtesy toward someone is a skill that will serve you well throughout your life and in many contexts. Always make criticism constructive and not personal. If you disagree with someone, they should not feel personally attacked. Keep the ideas separate from the person. I will always keep these principles in mind when communicating with you – please do the same toward me and your fellow students.

I reserve the right to penalize individuals who do not demonstrate these basic principles in their communications.

6. OTHER MATTERS

6.1 Students with disabilities

If you need support or assistance because of a disability, you may be eligible for accommodations or services through UCI's Disability Service Center (DSC). Please contact the DSC directly at (949) 824-7494 or TDD (949) 824-6272. You can also visit the DSC's website: <http://www.disability.uci.edu>. The DSC will work with your instructor to make any necessary accommodations. Please note that it is your responsibility to initiate this process with the DSC.

6.2 Copyright & intellectual property matters

Unless otherwise indicated, all materials presented and used in the course (except for materials from the textbook) are the instructor's own original material and intellectual property. It is an infringement to reproduce

and distribute *any* materials from this course. Course materials can only be used for each student's own personal educational enrichment. Any course materials sold or distributed to others could constitute an unauthorized derivative work and expose students to individual copyright infringement actions by the instructor. Therefore, no course material may be distributed to individuals not enrolled as students in the course during the current quarter for any reason. Course materials include, but are not limited to, lecture slides, video recordings, handouts, exams, and quizzes.

Finally, according to section 102.23 of the UC policy on Student Conduct and Discipline, a student may face disciplinary action for preparing, selling, or distributing course lecture notes for any commercial purpose (whether or not the student took the notes). You should be aware of this policy, not only for this class, but for all classes you may take in the University of California system.

6.1 Please give me feedback!

I consider this class to be a work-in-progress. So, I'm very interested in hearing your opinion. *What did you like about the class? What didn't you like? What did you feel worked well, or did not? Are there ways that the class could be changed to enhance student learning?*

There are some things I cannot change, such as access to technological resources or scheduling. But I welcome and invite your opinion – positive or negative – about any and all aspects of the course. Feel free to get in touch anytime. Some students don't want to say anything negative when a class is in progress. Of course, your opinions are just that, and expressing a negative opinion will not – in any way – factor into my assessment of your work. That said, each student earns 2-percentage points (2%) towards their final grade. The feedback will be used to improve the quality of the course.

7. SOME LINKS (feel free to suggest additions)

Other Campus Resources:

Learning and Academic Resource Center (LARC): <https://www.larc.uci.edu>

Center for Excellence in Writing and Communication <https://www.writingcenter.uci.edu>

Academic English Program in Academic English/ESL: <https://www.writingcenter.uci.edu/esl>

Confidential counseling and mental health services: <https://www.counseling.uci.edu>

Womxn's Hub: <https://womenshub.uci.edu>

Center for Black Cultures, Resources and Research: <https://blackcultures.uci.edu/>

UCI Veteran Services Center: <https://veteran.uci.edu/>

Lesbian, Gay, Bisexual Transgender Resource Center: <https://lgbtrc.uci.edu/>

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Office of Inclusive Excellence: <https://inclusion.uci.edu/undergraduate-resources/>

COURSE OUTLINE, SCHEDULE, & READINGS*

WEEK 1 (AUG 3 – AUG 7)

Before you start working on the course materials, complete the following three required reading assignments:

1. You must read this syllabus carefully and in its entirety. Staying enrolled in the class signals your acknowledgement and acceptance of the course rules and requirements as described in the syllabus.
2. You must read (a) UCI's policy on Academic Honesty, and (b) The UC policy on student conduct. Both are available via the links in section 4 of this syllabus. Remember, ignorance of the above policies is not a valid justification for academic dishonesty or violations of the student code of conduct. By staying enrolled in the course, you are saying you understand and agree to abide by the policies and requirements therein.

UNIT 1 – INTRODUCTION, REVIEW OF 10A, AND PROBABILITY DISTRIBUTIONS

Readings: Sections 4.1 – 4.3 of chapter 4

🕒 Video Introduction to Unit 1

- 🕒 Video lesson 1.1 Sampling and measurement, types of variables
- 🕒 Video lesson 1.2 Descriptive statistics
- 🕒 Video lesson 1.3 Probability distributions – discrete variables
- 🕒 Video lesson 1.4 Probability distributions – continuous variables
- 🕒 Video lesson 1.5 Normal probability distribution
- 🕒 Video lesson 1.6 Finding z-values for certain tail probabilities
- 🕒 Video lesson 1.7 Standard normal distribution
- 🕒 Video lesson 1.8 VIDEO QUIZ – UNIT 1 REVIEW

UNIT 2 – SAMPLING DISTRIBUTIONS OF SAMPLE MEANS

Readings: Sections 4.4 – 4.6 of chapter 4

🕒 Video Introduction to Unit 2

- 🕒 Video lesson 2.1 Sampling distributions describe how statistics vary
- 🕒 Video lesson 2.2 Sampling distributions of sample means – mean and standard error of \bar{y}
- 🕒 Video lesson 2.3 Sampling distributions of sample means – central limit theorem
- 🕒 Video lesson 2.4 Effect of sample size on sample data
- 🕒 Video lesson 2.5 VIDEO QUIZ – UNIT 2 REVIEW

WEEK 2 (AUG 10 – AUG 14)

UNIT 3 – CONFIDENCE INTERVAL FOR A PROPORTION

Readings: Sections 5.1 and 5.2 in chapter 5

🕒 Video Introduction to Unit 2

- 🕒 Video lesson 3.1 Statistical inference
- 🕒 Video lesson 3.2 Point and interval estimation for a proportion
- 🕒 Video lesson 3.3 Point estimate \pm margin error = confidence interval for a proportion
- 🕒 Video lesson 3.4 Computing confidence intervals for a proportion – what affects their width?
- 🕒 Video lesson 3.5 VIDEO QUIZ – UNIT 3 REVIEW

UNIT 4 – CONFIDENCE INTERVAL FOR A MEAN

Readings: Section 5.3 and review concepts in 5.6 in chapter 5

🕒 Video Introduction to Unit 4

- 🕒 Video lesson 4.1 Point and interval estimation for a mean
- 🕒 Video lesson 4.2 Point estimate \pm margin of error = confidence interval for a mean
- 🕒 Video lesson 4.3 Computing confidence intervals for a mean – what affects their width?
- 🕒 Video lesson 4.4 Understanding the t-distribution
- 🕒 Video lesson 4.5 VIDEO QUIZ – UNIT 4 REVIEW

WEEK 3 (AUG 17 – 21)

UNIT 5 – STATISTICAL INFERENCE FOR A POPULATION MEAN I: TESTING FOR SIGNIFICANCE

Readings: Section 6.1, 6.2 and 6.4 in chapter 6.

🕒 Video Introduction to Unit 5

- 🕒 Video lesson 5.1 Five parts of a significance test for a mean
- 🕒 Video lesson 5.2 Formulating testable hypotheses I
- 🕒 Video lesson 5.3 Testing for significance I: Test statistic
- 🕒 Video lesson 5.4 More on test statistics
- 🕒 Video lesson 5.5 VIDEO QUIZ – UNIT 5 REVIEW

UNIT 6 – STATISTICAL INFERENCE FOR A POPULATION MEAN II: CONCEPTS AND APPLICATION

Readings: Examples 6.2 (p. 145), 6.2 (p. 147), and 6.3 (p. 148) in chapter 6.

🕒 Video Introduction to Unit 6

- 🕒 Video lesson 6.1 Testing for significance II: P-values
- 🕒 Video lesson 6.2 More on p-values
- 🕒 Video lesson 6.3 Testing for significance III: Using α -level to make a decision

- Video lesson 6.4 Critical regions and interpreting significance tests
- Video lesson 6.5 VIDEO QUIZ – Application: Mean political ideology

WEEK 4 (AUG 24 – 28)

UNIT 7 – STATISTICAL INFERENCE FOR A PROPORTION I: TESTING FOR SIGNIFICANCE

Readings: Section 6.3 and revisit section 6.4 in chapter 6.

• Video Introduction to Unit 6

- Video lesson 7.1 Five parts of a significance test for a proportion
- Video lesson 7.2 Hypotheses I: Null vs Alternative
- Video lesson 7.3 Hypotheses II: Choosing between one-sided vs two-sided test
- Video lesson 7.4 Testing for significance I: Test statistic
- Video lesson 7.5 VIDEO QUIZ – UNIT 7 REVIEW

UNIT 8 – STATISTICAL INFERENCE FOR A PROPORTION II: CONCEPTS AND APPLICATION

Readings: Example 6.6 (pp. 153-154) in chapter 6, and Unit 8 practice problems online

• Video Introduction to Unit 6

- Video lesson 8.1 Testing for significance II: P-values
- Video lesson 8.2 Testing for significance III: Decisions and type-1 vs type 2-errors
- Video lesson 8.3 Review of critical regions and making decisions
- Video lesson 8.4 Interpreting significance tests
- Video lesson 8.5 VIDEO QUIZ – Application: Reduce services or raise taxes?

WEEK 5 (AUG 31 – SEP 4)

UNIT 9 – COMPARING TWO GROUPS I: COMPARING PROPORTIONS AND MEANS

Readings: Sections 7.2 – 7.4 in chapter 7

• Video Introduction to Unit 9

- Video lesson 9.1 Comparing two proportions I: Contingency Tables and conditional probabilities
- Video lesson 9.2 Confidence interval for *difference of proportions* ($\pi_1 - \pi_2$)
- Video lesson 9.3 More on CI's for $\pi_1 - \pi_2$
- Video lesson 9.4 Significance tests for $\pi_1 - \pi_2$
- Video lesson 9.5 More on significant tests for $\pi_1 - \pi_2$
- Video lesson 9.6 VIDEO QUIZ – Application: Does prayer help coronary surgery patients?

UNIT 10 – COMPARING TWO GROUPS II: CONCEPTS AND APPLICATION

Readings: Examples 7.1 and 7.2 (pp. 182 – 185) and Examples 7.3 and 7.4 (pp. 188 – 190) in chapter 7

• Video Introduction to Unit 10

- Video lesson 10.1 Comparing two means I: Correspondence confidence intervals and significance tests
- Video lesson 10.2 Confidence interval for difference of means ($\mu_1 - \mu_2$)
- Video lesson 10.3 More practice on Cis for $\mu_1 - \mu_2$
- Video lesson 10.4 Significance tests for $\mu_1 - \mu_2$
- Video lesson 10.5 More on significance tests for $\mu_1 - \mu_2$
- Video lesson 10.6 VIDEO QUIZ – Application: Comparing housework time of men and women