Statistics W21 is a service course designed primarily for Business students. Neither linear algebra nor calculus is required, although some concepts seem more natural if you understand integration and differentiation. You do need to be comfortable with math at the level of high-school algebra (e.g., the equation of a straight line, plotting points, taking powers and roots, percentages). Tight logical reasoning is crucial for success. The beginning of the course introduces reasoning and logic; there is a more mathematical treatment of logic in the middle of the course. The middle of the course involves a fair amount of combinatorics - counting. The emphasis of the course is critical thinking about quantitative evidence. Topics include reasoning and fallacies, descriptive statistics, association, correlation, regression, elements of probability, set theory, propositional logic, chance variability, random variables, expectation, standard error, sampling, hypothesis tests, confidence intervals, experiments and observational studies, as well as common techniques of presenting data in misleading ways.

It is difficult to succeed in today's world without a solid understanding of basic statistics. This course aims to provide you with the statistical tools you will need in the fields of business and economics, or just to be an informed citizen and consumer.

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**Course Information for Stat W21:**
Please read this page carefully, especially the instructions and troubleshooting advice. The first assignment checks to see if you have read these materials carefully.

To use the online materials, you may use Firefox, Chrome, or Safari. Internet Explorer is not recommended. If you ever have a problem with examples or assignments, please send me an email with the problem you encountered, the browser you were using at the time (along with the version).

Late assignments are NEVER accepted, not for any reason. There is no method for accepting late assignments. More information on the assignments follows below.
Course Instructor:

Shobhana Murali Stoyanov (shobhana@berkeley.edu)

325 Evans Hall, University of California, Berkeley

Office Hours:

• The instructor and the GSIs will all hold both in-person as well as online office hours for this course. There will be many office hours to choose from throughout the week, so please make sure to go to these to clarify concepts and get help. Do not wait until right before an assignment is due.
• Adobe Connect will be used for the online office hours. You do not need an account, but can log in as a guest.
• More details about the in-person office hours will be listed on the course page at bcourses.berkeley.edu.
• You will also need a webcam and working headset (or built in camera and microphone) in order to participate in office hours.
• You must enter the online office hour within the first 15 minutes, if you are going to come to the office hour at all.

Student Learning Center:

• The SLC usually offers drop-in tutoring for Stat 21 during the day.
• For more information, please contact Mike Wong (mjwong@berkeley.edu), who is the Mathematics and Statistics Program Coordinator at the Student Learning Center (located at 103 Chavez Student Center; more information at slc.berkeley.edu).

Discussion Forum (Piazza):

• We will be using Piazza for our class discussion forum. There will be a link on the left navigation menu of the course page, which will take you to our class page on Piazza. Please sign up there for the course.
• If you have a general question, about the material in the text, or a clarification regarding homework, please post it on Piazza. DO NOT send an email about your question. You will have to search the forum to see if your question has already asked, and if not, go ahead and post it.
• I encourage you to try and answer each other's questions. The GSIs and I will monitor the discussion forum, and endorse correct answers. I have been using Piazza for a few semesters now, and find it enormously useful.

Required text and other readings:

• The text is SticiGui. It is written by Professor Philip Stark, and is freely available online. You must have Javascript enabled in the browser. The
browser must accept cookies from the originating server. You should have the latest version that is available at the beginning of the summer.

- A recommended text is *Statistics*, by Freedman, Pisani, and Purves (4th Edition, W.W. Norton and Co.) This is an excellent book to further your understanding of the subject.
- A recent book that has received good reviews is Nate Silver’s book *The Signal and the Noise*, which is about predictions in the face of uncertainty. Silver was in the news for his 100% success rate in his predictions for the 2012 US presidential elections.
- Another fun book is *How to lie with Statistics* by Darren Huff. It is not a recent book, but still relevant.
- If you are a soccer fan, then *The numbers game: Why everything you know about soccer is wrong* is an interesting read.
- The author of *Naked Economics*, Charles Wheelan, has written a book on statistics, called *Naked Statistics* - also fun to read.

**Lectures:**

- There are recorded lectures of Professor Philip Stark that are embedded within the text. Please use the SticiGui page to view them. There is also a link from the drop down menu on that page to the lectures, if you wish to view them independently of the text.
- I will be adding slides covering some of the topics to the course page. I will let you know as and when content is added to the page.

**Homework Assignments:**

- The assignments are available online at: [http://www.stat.berkeley.edu/~stark/SticiGui/Problems/index.htm](http://www.stat.berkeley.edu/~stark/SticiGui/Problems/index.htm). The due dates will be posted when the Spring semester begins, and they will be *due as posted*. (Note that you use Internet Explorer at your own risk. We do not provide any guarantee that it will work. All other browsers should work fine.)
- To access the assignments: once you are on the assignments page on SticiGui, please select our course from the drop down menu. You will then be asked to input your name, email, and SID. Please use the email and SID that you have submitted to bcourses, since that is what we will use to verify your identity. The SID should be numbers only. If you have any problem logging into the assignment page, please let me know. I will check my mail until 5pm only, so please do not email me ten minutes before an assignment is due, since that would be long past my bedtime. I do not check email regularly on the weekend.
- There are usually 2-3 problem sets due each week, on Mondays, Tuesdays and Wednesdays. Some weeks may have four assignments due. You may turn them in early but *late assignments will not be accepted for any reason*. If you wait until the last minute to submit your assignment, you will risk not
being able to submit it on time due to congestion. Please plan to submit your homework with time to spare.

- You are allowed to submit each assignment **up to five times** before the due date. The **last submission** (not necessarily the one with the highest score) counts. You can see your score after each of the first three submissions. After the fourth and fifth submissions, you can see your score and which problems you missed: The problems you missed are identified on the confirmation screen after you submit - not in the problem set itself. You only get that one chance to write them down, and there is no other way to see which problems you missed until after the due date. The problems are identified as (Qxx), which matches the Q-numbers in the assignment. **Q-numbers and Problem numbers are not the same:** Problems can have many parts, each of which has a Q-number.

- While inputting your answers, do NOT round off numerical answers, not in your final answer, nor in intermediate steps. This can result in your answer being marked incorrect. If you are inputting a number that is at least 1,000, you may input it with commas (but you don’t have to). You may use scientific notation if you wish.

- After the due date of each assignment, you can see the correct answers by opening the assignment again. After the due date, when you answer each problem, you will see an X or a check mark, just like in the book chapters.

- This class uses **mastery based grading** for the homework. You get credit for a homework assignment **only if you get a score of 80% or higher** on that assignment. If you score below 80% on an assignment, you get no credit for that assignment - it counts as a zero in your homework average. You did not master the material adequately. If your score on an assignment 80% or higher, the credit you get is your score. For example, suppose there are 25 homework sets and your scores are five 70s, five 80s, five 90s and ten 100s. You get no credit for the five 70s: They count as zeros. Your homework score is:

\[
(5 \times 0 + 5 \times 80 + 5 \times 90 + 10 \times 100)/25 = 74\%
\]

- The assignments are significantly harder than the exams, and will require some thinking on your part. Some ask you to apply the material to more complex problems that— superficially—are not like any problem in the book. In contrast, the depth of exam questions is limited by the duration of the exam. Exam questions are more like the questions on the practice exams and in the book chapters. The exams are designed so that the faster students will finish in less than half the time available. Most students do not feel time pressure in the exams. Historically, the first students leave finals after about an hour and ten minutes.
Exams:

- **Midterm**: The midterm for this class will be on Wednesday, March 18, from 6:00-7:30pm in 2050 VLSB. If you are an offsite student, you **must contact** Victoria Good (Victoria.Good@ucop.edu) as soon as possible, (once the term begins), so that you can arrange to take your exam at a recognized proctor site.

- **Final exam**: The final exam is on **Tuesday, May 12, from 8-11 am** (exam group 5). The room will be announced later. If you are an off-site student, please contact Victoria Good to arrange for your proctored exam.

- The final exam is cumulative. Review exams for practice are available online, on the main SticiGui page.

- You **must** bring a 100-question Scantron form (form 882), a number 2 pencil and your UC Berkeley student ID to the final. If you do not submit your answers to the final on Scantron form 882, I will not grade it. If you are not in the Berkeley area, I would strongly recommend you get some Scantron forms 882 right away. If you leave it to the last minute, you might not be able to find one near you. The forms are for sale online. If you do not bring your student ID to the final (and show it when asked), I will not grade your exam. I do not bring scantrons to the final for students who may have forgotten. I will not grade exams for which the answers are not on the appropriate form. The machine cannot take them.

- You **may** bring two 8.5" x 11" pages of notes, front and back (4 sides, typed or handwritten), a calculator, a slide rule, a pen, extra scantron forms to auction to people who forgot to bring their own, etc.

- You may use two types of calculators for the exam. You may use either a nonprogrammable scientific calculator, or a basic six function calculator - in which the calculator does not have any functions other than the following six: addition, subtraction, multiplication, division, percent, and square-root. It may have a one-number memory. Calculators that have wireless communication or the ability to store notes, webpages, images, or the like are prohibited. You **may not use any** wireless device (including cell phones), PDA, computer, scratch paper, etc.

Notes, advice, etc.

- This course is not easy, as it is a self-study course. You will have to be **very** disciplined as you pace yourself, since it moves fast. The homework is demanding, and you will have to think about the concepts. It won’t do to just search for the answer, or try to replicate a method without understanding the concept behind the method.

- Make sure that you watch the lectures (Professor Stark’s lectures that are embedded in the textbook), and read the book carefully. That means reading it, and working through the examples.

- Don’t just look for the formula. Try to see why the example real world scenario and the formula are connected. It is not all about calculation.
• **Don't game the system.** If, on your first submission, you get something wrong, try to understand why rather than just selecting a different answer. This will make a difference on your exam. Remember – the exam has only one submission!

• Don’t google the problem. Again, it might serve you momentarily, but you will not have understood the concept, and this will affect your exam performance.

• Make sure to read the chapter before trying the homework, and to work all the examples and exercises in the text. If you reload the page, you will get new ones that you can work.

• Please **write down the answers to your assignments.** This is for two reasons. If you save your answers, they are saved on your computer as a cookie, and you will not see them if you log in from a different machine. Furthermore, cookies are not reliable storage, and your answers can get lost. I have seen many crestfallen students who have lost answers after working on them a while. Don’t let this happen to you!

• If you have a question, you can post it to Piazza. Please do not send emails about a specific homework problem to the GSIs or me. Search in Piazza, and then post your question. You may get a reply from a fellow student in minutes! Do not ask exactly for the answer to your homework problem. That is cheating!

• Finally, from Professor Philip Stark's page: "... On the other hand, students who do well in this course seem genuinely interested in understanding the material. They read the chapters before trying the homework. They watch the lectures. They work all the examples and exercises in the chapters, then reload the page to get more examples and exercises and work those, too. When they see something new, they try to relate it to things they have seen before. They try to imagine other situations in which it could be used. They think and grapple with the material before asking for help. They ask probing questions and keep at the homework until it makes sense to them—not just until they have memorized it or gotten the right answer. They go back over their homework after the due date to understand why they missed what they missed. They care more about learning than about their grades. From experience, I think the difference between doing well and doing poorly is much more about having "fire in the belly"—wanting to understand things—than about native intelligence or mathematical aptitude or anything like that. You have to want to get to the bottom of things. If you don't, you'll never really understand the material: You cannot master it by mimicking what's done in examples. You have to care about why that's what was done in the examples."