Do you remember applying to UC Berkeley and wondering if you would get in? Perhaps you turned to the Wikipedia entry for Cal and found that for Berkeley freshmen, the “SAT interquartile ranges were 620–740 (Reading), 650–770 (Math), and 640–750 (Writing)” [1]. Or maybe you are currently applying to MBA programs, and discovered that, for Haas, “the average [GMAT score] for the fall 2010 entering class was 718, and 80% of the class scored between 680 and 760” [2]. Could you make sense of these statements? Maybe you are currently contemplating how best to succeed in this course and you’ve been faced with conflicting reports that study time does or does not matter [3, 4]. Or maybe you’re more interested in the evidence that being well-groomed is associated with a statistically significant increase in grade [5]. Can you decide whether you are better off attending office hours or buying new bodywash? Or perhaps you feel lucky, and all you can think about is the end of Summer Sessions, when you can go on a trip to Las Vegas. Should you play roulette or the slot machines?

This course will familiarize you with the basics of statistical thinking, language, and techniques, thus equipping you to intelligently address these (and other) questions that have real life consequences and effects. By the end of this course, you will be able to compute and interpret summarization statistics, such as median and IQR. This course will also enable you to think critically about the statistical claims often encountered in our daily lives. You will gain the ability to write and interpret inferential statements like “X is statistically significantly larger than Y”. By the end of this course, you will know how to quantify the linear relationship between two variables, and make predictions from one to another, such as predicting how much a grade increases with an increase in study time. Finally, this course will teach you how to compute probabilities, enabling you to evaluate issues of chance (such as gambling).

**Instructor:** Tessa Childers-Day  
Email: tchilders@stat.berkeley.edu  
Office Hours: Monday and Wednesday, 10:30am–12:00pm in 357 Evans Hall  
Tuesday and Thursday, 10:30am–11:00am in 357 Evans Hall

**GSI:** Mo Zhou  
Email: mzhou@berkeley.edu  
Office Hours: Monday and Wednesday, 2:00pm–3:00pm in 444 Evans Hall  
Tuesday and Thursday, 2:00pm–4:00pm in 444 Evans Hall

**Email Policy:** Learning, especially that of a mathematical nature, happens most smoothly in person, where misunderstandings can be addressed in real time. Thus, please do not email either the instructor or the GSI with learning related issues (“How do I solve problem X”). Email is to be used for administrative issues only.

**Prerequisites:** Successful completion of at least one semester of calculus is a prerequisite for this course. Please contact the instructor if you are registered for this course but have not completed one semester of calculus.

**Weekly Schedule:** This course lasts 8 weeks, from 23 June 2014 to 14 August 2014  
Monday through Thursday, 9:00am – 10:30pm in 150 GSPP Hall (Lecture)  
Monday through Thursday, 12:00pm – 1:00pm in 334 Evans Hall (Section 101)  
Monday through Thursday, 1:00pm – 2:00pm in 334 Evans Hall (Section 102)

**Detailed Schedule:** The course schedule (subject to update) is available at [http://goo.gl/F1NryR](http://goo.gl/F1NryR).

**Materials:** *Statistics* by Freedman, Pisani, and Purves (4th edition) is the required textbook for this course. You should read the assigned chapters before coming to lecture, as the book is highly readable. This will allow you to ask questions that will clear up misconceptions and improve your learning experience. You are responsible for all of the readings, and the book will complement, not replace, lecture. Likewise, coming to lecture will not replace reading the textbook. The notes/citations (superscripts found in the text) are interesting, but you are not responsible for the material contained in them. Each section of the book contains a set of exercises, the answers to which are found in the back of the book. You should try all of these exercises as they are good practice for the homework, quizzes, and exams. Please bring your text to section. The free
You will need a calculator that can raise numbers to a power, compute factorials, and take square roots. It need not be a statistical calculator, such as a TI-83.

**Web Presence:** All lecture slides, course materials, and resources will be posted to the course website [http://www.stat.berkeley.edu/~tchilders/stat20/stat20.html](http://www.stat.berkeley.edu/~tchilders/stat20/stat20.html). Announcements and grades will be posted to the course’s bCourses site. You are responsible for checking bCourses and the course website for new materials, announcements, etc. The overall course schedule (subject to update) is available at [http://goo.gl/F1NyRk](http://goo.gl/F1NyRk).

**Grade Breakdown:** Overall grades will be computed as follows:

$$20\% \text{ Homework} + 20\% \text{ Quizzes} + 30\% \text{ Exam 1} + 30\% \text{ Exam 2}$$

**Exams:** There will be two exams, both given in class, on July 16 and August 13, respectively. Neither exam will be comprehensive. **There will be no late, early, or repeat exams. If you cannot take both exams, you cannot take this class.** More details will be made available as the exams draw near.

**Homework:** Homework will be due in class twice per week. There will be 12 homework assignments and your two lowest percentage scores will be dropped in computing your overall homework score. Homework will consist of problems from the textbook, and may include other activities/problems as well. You are welcome to collaborate on homework (exchange ideas or general strategies), but students must turn in their own assignments, completed in their own words and with their own work. Homework is a place for you to learn, so simply copying another student’s work is not only prohibited, it is detrimental to your learning, and thus to your performance on quizzes and exams. Due to limited reader hours, homework will be graded both for completeness (was each problem attempted?) and a subset of the homework will be graded for correctness (were the selected problems completed correctly?). Homework solutions will be posted to a glass case in the main 3rd floor hallway of Evans Hall.

**Quizzes:** Quizzes will be given in section, once per week. Quizzes will be short (less than 20 minutes), and will cover the same material as recent homework assignments. Understanding the homework will lead to good performance on the quizzes, so no additional study time should be necessary (other than that of understanding the material covered in the homework). **There will be 6 quizzes, and your lowest percentage score will be dropped in computing your overall quiz score.**

**Late/Missing Work:** Extensions/make-ups on homework and quizzes will be granted only in cases with extenuating circumstances. This must be arranged with me, and I have sole discretion over whether or not to grant an extension or make-up. As is noted above, no extensions or make-ups will be given for the either of the exams.

**Grade Disputes:** If you wish to dispute a grade you must submit your dispute to me in writing, along with the original assignment. You must indicate each issue that you wish to dispute, and include reasons why you believe that your grade should be changed. I must receive your dispute at least 24 hours, but no more than one week, after you receive your assignment back. I will regrade the entire assignment, and your grade may be raised, lowered, or remain the same.

**Section:** Attend either (subject to space at the discretion of the GSI). The purpose of section is to put into practice the skills and techniques learned in lecture via problem solving. This will usually be achieved using the Review Exercises from the book. Section is also a time to get any questions you might have answered. The problems to be covered in section are posted on the course schedule—you are highly encouraged to attempt these problems on your own before attending section.

**Attendance and Participation:** Attendance and participation in lecture and section are not required. However, attending both lecture and section will greatly improve your learning experience and your ability to succeed in this course. Furthermore, in cases of borderline grades, attendance/participation may be used to help (though never hurt) your grade.
DSP: If you are a DSP student, I am happy to make accommodations as necessary. Please contact me within the first two days of class, so that arrangements may be made before the first quiz.

Academic Honesty: The grade that you earn in this course should be just that—the grade that you have earned. So, in fairness to students who do the work, and put in the time and effort, cheating will not be tolerated. Cheating includes (but is not limited to) turning in work that is not your own, using prohibited materials (electronic or written) during an exam or quiz, copying off another person’s exam or quiz, allowing someone to copy off of your exam or quiz, or having someone take an exam or quiz for you. Any work submitted should be your own, and should not have been used for credit in another course, unless you have prior permission from this instructor. Any work submitted that draws from the work of another should be identified, and the original author cited. If you are unclear about expectations, speak with the instructor or GSI. Dishonest conduct will be reported to Student Judicial Affairs.

Advice: My most important piece of advice to you is this: keep up-to-date with all readings and assignments, and seek help if you do not understand a concept or problem. Statistics is a subject in which each new concept builds on previous concepts. Thus, it is imperative that you understand every concept, or you will be unable to understand later concepts. Furthermore, this is an accelerated course, meaning there is very little time to fall behind. Start the readings and homework early, giving yourself plenty of time to attend office hours, ask questions in class, and seek outside help if necessary. The GSI and I are here to help you learn this material, so I encourage you to make use of us during office hours and class time. The Student Learning Center is another great resource. They have free drop-in tutoring available to help you with both conceptual issues and questions about homework problems. They are located in the Chavez Student Center, and their website is sic.berkeley.edu. The Statistics Department also maintains a list of fee-for-service tutors, available at http://www.stat.berkeley.edu/483.

Important Dates: The following dates should be noted

- **June 23:** First day of class
- **July 3:** Last day to add class and/or cancel registration
- **July 11:** Last day to withdraw or drop with partial refund
- **July 16:** Exam 1
- **July 17:** No class
- **July 18:** Last day to withdraw or drop with no refund
- **August 1:** Last day to change grading option
- **August 13:** Exam 2 (and last day of class)

Course Outline: The course will be broken down into the following units:

1. Data Collection and Studies (Chapters 1, 2, 19, 22): In this unit, you will learn to
   - Compare and contrast observational and experimental studies
   - Analyze the design of an experiment, looking for sources of bias, confounding, and chance error
   - Identify different types of sampling, compare their strengths and weaknesses

2. Univariate Data (Chapters 3, 4, 5, 6): In this unit, you will learn to
   - Identify types of data and choose an appropriate way to display them
   - Compute (estimate) sensible summary statistics from a data set (histogram)
   - Sketch and describe the shape of a histogram or distribution
   - Utilize the standard normal table and properties of the normal curve to find areas/percentages

3. Bivariate Data (Chapters 8, 9, 10, 11, 12): In this unit, you will learn to
   - Describe how/why one variable can be informative about another
   - Construct accurate inferences about one variable based on values of another
• Recognize (and refute) fallacious inference statements (correlation ≠ causation, regression fallacy, etc.)

4. Basic Probability (Chapters 13, 14, 15): In this unit, you will learn to
• Define/describe the properties of probabilities
• Evaluate simple chances accurately and efficiently

5. Box Models (Chapters 16, 17, 18, 20, 21, 23): In this unit, you will learn to
• Use box models to evaluate probabilities (know the box, find the chances of a draw)
• Invert a box model (know the draw, find the chances of a box)

6. Hypothesis Testing (Chapters 26, 27, 28, 29): In this unit, you will learn to
• Recognize and explain the difference between statistical significance and practical significance
• Explain and exploit the duality between confidence intervals and testing

References


