BIEB 100: Biostatistics Lecture & Lab
Course Information (updated 4 January 2014)
Winter Quarter 2014
Lecture: MWF 3:00-3:50PM Ledden Auditorium

Be sure to check the course website for any updates.

Lab A01: Thursday 12:00-12:50PM, ERCA 117
Lab A02: Thursday 1:00-1:50PM, ERCA 117
Lab A03: Thursday 2:00-2:50PM, ERCA 117
Lab A04: Thursday 3:00-3:50PM, ERCA 117
Lab A05: Friday   1:00-1:50AM, ERCA 117
Lab A06: Friday   2:00-2:50PM, ERCA 117

Course website:
http://www.biology.ucsd.edu/labs/rifkin/courses/bieb100/w14/bieb100Winter2014.html

Please note: information in this syllabus is subject to change. Any schedule changes will be announced in class and posted on the website. Make sure to frequently check the website to keep updated about the weekly readings, assignments, and exam schedule. Updates will be noted in the changeLog section.

Philosophy
Educational research has shown that student engagement is the most important component of learning. Learning involves wrestling with new concepts, practicing new techniques, and rethinking old assumptions. My role as the professor and the role of your TAs is to facilitate your learning by providing targeted materials for you to use, structuring your exposure to a logical sequence of topics, clarifying misconceptions, and helping you work through difficult material. You should see this course as a collaboration. How much you get out of it and how well you do in it will depend upon how much you engage with the material and how much discipline you apply towards mastering new concepts and deploying them.

Students often come to an introductory statistics course expecting to memorize a series of recipes and formulae to apply in well-defined situations. Statistics is not a cookbook for using formulae but rather a process for getting reliable answers to interesting questions – it embodies the scientific method. Statistical formulae are sometimes (but not always, as we will see) the last step in this process and make no sense without the preceding components. Moreover, the wide variety of statistical tests out there to handle disparate kinds of data are all based on a common logic. Understanding this logic transforms statistics from a hodge-podge of individual, unrelated, arcane formulae into a conceptually coherent and flexible framework for answering all kinds of questions and for thinking about the world.

Every day you are exposed to numbers and data and conclusions drawn from them (or despite them). They are rarely as clean and clear as a textbook problem and yet they form the basis for crucial public and private decisions, political and social debate, and scientific discoveries. Statistics and the scientific method is a way of evaluating these numbers and drawing conclusions from them in a reliable and justifiable way.

This course is designed to help you develop competence in three related areas.

The first is *statistical literacy*. This involves:
      1) awareness of data, how they are used and misused, and the consequences of each
      2) understanding basic statistical concepts
      3) knowing the basics of how to collect data and summarize it
      4) knowing how to relate statistical results back to the context of the original question
      5) being able to communicate the results to others

The second is *statistical reasoning*. This involves:
      1) applying statistical ideas
      2) making sense of statistical information
      3) interpreting graphical displays and numerical summaries
      4) checking whether intuitive conclusions from data really hold up

The third is *statistical thinking*. This involves the following habits:
      1) consider how to collect meaningful and <u>relevant</u> data to answer a particular question
      2) keep in mind the statistical process as a whole and how the different pieces fit together
      3) <u>be skeptical</u>, particularly about how data is obtained

4) think about the variables involved – are they the right ones for the question? how will they behave? are there other variables that might be important?

5) always keep the context in mind. How does the data relate back to the original question?

6) understand the relevance of statistics, especially when you want to make a causal claim or say something is unusual.

7) think beyond the textbook.

My hope is that you will come out of this course with a healthy and statistically grounded skepticism about the numbers and data that pervade our society and that you will be able to collect data and properly draw conclusions from it and evaluate conclusions that others draw from their own data. We will get to that point by carefully studying and repeatedly practicing the methodology of statistical investigation.

Important dates (Quiz dates may change depending upon the progress of the course)

15 January 2014	Quiz (preliminaries)
29 January 2014	Quiz (chapter 1)
5 February 2014	Quiz (chapter 2)
12 February 2014	Quiz (chapter 3)
14 February 2014	Midterm (chapters P-3)
24 February 2014	Quiz (chapter 4)
5 March 2014	Quiz (chapters 5, 6)
10 March 2014	Quiz (chapter 8)
19 March 2014, 3-6 PM	Final exam (cumulative)

Assessment
There will be four kinds of assessment in this class.
Quizzes
Seven quizzes are scheduled. These will have 3-4 questions and will usually focus on a single chapter (with two exceptions as noted). They will be given in the first 10-15 minutes of class. The goal of these quizzes is to give you an opportunity to test your understanding of the material as the course goes along so that you can adjust your studying if need be. They will also give you a feel for the types of questions that will be on the exams. These questions could be multiple choice, short answer, and problems to solve.
Exams
There will be one in-class midterm and a final exam. The midterm will cover material from chapters P-3. The final will be cumulative, reflecting the fact that the material in the course is cumulative. Exams will have a mix of questions specifically testing higher and lower order mastery of the material.
Lab reports
During each lab section you will either go through an "Investigation" or do an activity related to the material covered in lecture that week. Instructions and worksheets for these can be found online. You will be responsible for turning in a lab report in the following week - either the questions of the Investigation or a series of questions from the activity.
Homework

Homework will *generally* be due *in class* in the class session following the one in which we finish a chapter. Chapters 1 and 3 are long and so they will be broken into two homeworks each. The homework usually will take the form of problems from the textbook. A sample (usually 3-5) of the assigned problems will be graded. Late homework will not be accepted, so plan ahead if you will be absent. Answers to homework questions will be posted in TED.

The grading breakdown for components of the course is:

Quizzes	15% (drop lowest 2)
Midterm	15%
Final	33%
Lab activity reports	15% (equally weighted across reports)
Homework exercises	20% (equally weighted across the homeworks)
Pre-class and post-class tests	2% (simply for taking them before the deadlines)

A (90-100%) B (80-90%)   C (70-80%)   D (60-70%)   F (below 60%)

+/- will be assigned depending upon the distributions of scores within each of these letter grades.

Textbook
We will use a textbook called *Introduction to Statistical Investigations*. You can download a pdf of the textbook from the TED course website. If you'd like a hard copy, the UCSD course packets folks will print a 3-hole-punched copy for you. You can order a copy from the MyReader department at the UCSD Bookstore.

Web resources
Course information can be found in two main locations on the web:

Class website (url at the beginning of this syllabus)
Links to applets
Homework assignment lists and due dates
Course information
Relevant datasets
Links to interesting articles/news stories involving statistics

TED
Discussion board - forum for you to ask questions of each other. This will be monitored by the TAs.
Grades
The textbook, homework problems, 'investigations' and other assignments for section.
If you experience problems with TED, please contact: iwdc@ucsd.edu.

Contact Information

Professor
Scott Rifkin
Ecology, Behavior, and Evolution

Division of Biology
Office Hours: Tuesday 9:30-10:30, Muir 2150
sarifkin@ucsd.edu

Teaching Assistants
Brian Hong
Biological Sciences
Section: Thursday 2
Office Hours: Wednesday 2-3, Muir 4135
brhong@ucsd.edu

Tom Li
Biological Sciences
Section: Thursday 12,1
Office Hours: Monday 1:45-2:45, Mandeville Coffee Cart (inside if it is raining)
dol036@ucsd.edu

Rick Thomas
Ecology, Behavior, and Evolution
Section: Thursday 3
Office Hours: Monday 10:30-11:30, Mandeville Coffee Cart (inside if it is raining)
rsthomas@ucsd.edu

Suneer Verma
Biological Sciences
Section: Friday 1,2
Office Hours: Friday 4-5 (after class), Mandeville Coffee Cart (inside if it is raining)
suneerverma@gmail.com

Software
Software comes in handy for doing statistical calculations and simulations. We will make extensive use of a set of web applets which are integrated with the textbook but also can be used for your research or other classes. Most can be found at: http://www.rossmanchance.com/ISIapplets.html. If you are using a tablet, try http://www.math.hope.edu/isi/applets.html. Locations of any others can be found in the *Applets* section of the website.

Be aware that these web applets sometimes take a while to load. They all work, so if you cannot get them to load, try a different web browser or a different computer. They may work better with some browsers than others.

Cheating
Students are expected to do their own work, as outlined in the UCSD Policy on Academic Integrity. Cheating will not be tolerated, and any student caught engaging in academic dishonesty will fail the course. He or she may also be suspended from UCSD. All exams will be closed-book and closed-

notes, so all personal materials must be stowed under your seat. Only exams written in non-erasable pen will be considered for regrades.

Computers and phones in class and sections
Please do not use your computers or phones or other distraction-enabled devices in class. Laptops are not a good tool for taking notes in class. They do not have the versatility necessary for capturing text, sketches, arrows, etc. that are important for note-taking in statistics. Bring paper and something to write with to take notes in class. If you have a stylus to write on a tablet, then you may use that, although only for note-taking. We will use computers for some exercises in sections, but you are expected to be courteous to your fellow students and TA and use them only for the intended purposes. Students using computers for purposes other than those related to the section will be asked to leave. Phones are only to be used for emergencies and outside the classrooms.

Podcasts
The course will be video podcast. You can download video podcasts from: http://podcasts.ucsd.edu/podcasts/default.aspx?PodcastId=2194&v=1. However, be aware that the video portion only captures what is projected onto the screen from a computer. Since the chalkboards will be used heavily in lectures, the video portion of the podcast will be of limited use. The audio podcast link is: http://podcasts.ucsd.edu/podcasts/default.aspx?podcastId=2194&l=0

Feedback
Learning is a collaborative endeavor and so your feedback is crucial. At the end of some class periods I will ask you to spend a few minutes jotting down the muddiest and most interesting points from the lecture on an index card and turn it in. This will enable me to clear up confusion in the next class instead of letting it linger. The discussion board on TED will be monitored by the instructors. All of the instructors will hold office hours.

Extra supplies needed for this class
Class demonstrations will occasionally require tools. Please go to http://www.random.org/integers/?mode=advanced and print out a set of 1000 random digits from 0 to 9. (For easy printing choose 15 columns in Part 1, "Bare bones text" in Part 3, and "generate your own" in Part 4). Please also use this website to print out a set of 100 random numbers from 1 to 200. Please bring these sheets and a coin to every class. If we will need a different tool for a demonstration or for lab (e.g. dice, deck of cards, ruler, etc.) it will be posted on the website and announced in class. Please also bring index cards or a small piece of paper for feedback.
Summary: **random numbers sheet, coin, deck of playing cards, index card/paper**

Regrades
If an error has been made in the grading of your homework or exam, you may submit it to your TA (homework) or Prof. Rifkin (quiz, exam) within *one week* of distribution for a regrade. Do not go to a TA for an exam regrade. **Your exam must first be submitted to Prof. Rifkin with a written description of the grading error**. Regrade requests will not be processed without a written description of the grading error. **No regrades will be given for homework or exams written in non-permanent ink or pencil.**

Missed exams
There are no makeup exams. If you unexpectedly miss the midterm, you will be required to provide official documentation of an unavoidable emergency (e.g. serious illness, etc.). Without such documentation, you will receive a 0 for the midterm. If you know beforehand that you cannot be present in the classroom for the midterm and (1) can present a valid excuse (such as a note from your coach for a sporting event) at least one week in advance of the exam and (2) are receiving a passing grade in the course as of one week before the exam, then a sealed copy of the exam will be given to the coach, musical director, etc. who will administer the exam **at the class exam time**. If no UCSD official can be found to administer the exam, then it will count as a missed exam. If the exam cannot be taken at the class exam time, then it will count as a missed exam. **No exam can be taken before or after the scheduled exam date and time.** If you miss the midterm with a valid excuse (unavoidable emergency or a pre-arranged absence as per above) the percentage of your grade from the final will be increased accordingly.

The final exam is on Wednesday, 19 March from 3-6PM. There is no alternative final.