BTRY 3010 - Biological Statistics I - Syllabus (2018)

Teaching Staff

	Name	Lecture/Lab	Office Hour
Professor	James Booth	TR 08:40-09:55, Warren B25	Th 4:00-5:00pm, Comstock 1181
TA (Lab 401)	Kirsten Wohlars	M 08:40-09:55, Mann B30A	TBA
TA (Lab 402)	Reema Kumar	M 10:10-11:25, Mann B30A	TBA
TA (Lab 403)	Christina Sanchez	M 11:40-12:55, Mann B30A	TBA
TA (Lab 404)	Jennifer Catalano	M 02:45-04:10, Mann B30B	TBA
TA (Lab 405)	Jeremy Wessel	T 11:40-12:55, Mann B30B	TBA
TA (Lab 406)	Arjun Chattoraj	T 07:30-08:45, Mann B30A	TBA

We encourage you to make full use of office hours. If you have a question about the material or an assignment and cannot make it to office hours, we encourage you to post this question on piazza (your post can be made anonymous to other students, but the teaching staff will be able to see who is posting).

Course Description

The goal of this course is to introduce students to statistical methods for analyzing data. We will emphasize the basic principles and criteria for selecting the appropriate statistical technique. Students will get hands-on experience applying the topics covered to real datasets using R, a powerful and popular open-source statistical computing language.

Specific Topics (time permitting):

- Introduction to coding in R via RStudio
- Descriptive statistics & data visualization
- Probability
- Random sampling
- Sampling distributions
- Inference for a single population
- Comparisons between two populations
- One- and two-way analysis of variance
- Analysis of categorical data
- Simple linear regression
- Multiple linear regression
- Least squares and Maximum Likelihood Estimation

In addition to the more standard topics covered in an introductory statistics class, special emphasis will be placed on practices that facilitate reproducible analyses. There has been growing attention in the scientific community to the importance of adopting practices that ensure reproducibility. If you are interested in reading more about this topic, see here or here or here or here or here.

Recently developed tools in R have made it easy to create reports that clearly document the steps taken in an analysis. Labs, assignments, lectures (and even this syllabus!) will all be generated with this tool.

Textbooks

OpenIntro Statistics is a free, online textbook. If you prefer a printed version of the text, it can be purchased for $14.99.

A Beginners Guide to R is available online through the Cornell university library.

Software

We will be using R Studio, which is an easy-to-use environment for coding in R. The first homework will guide you through installing the necessary software (and if you have any difficulty, feel free to ask a TA during office hours). **We assume no prior knowledge of R in this course.** Labs will gradually introduce you to R. There are also many good resources for R online. For example, this website provides an interactive introduction to R, and A Beginner's Guide to R, which is accessible for free online through the Cornell library, is a book that may be helpful.

Websites

There are two relevant websites for the course. Blackboard will be used for homework submission, recording grades, and posting course materials; Piazza will be used as an online discussion forum. The discussion forum is a good way to ask questions that you think other students would like answered as well. Students may answer each other's questions, but TAs will do so as well (note that in some cases it may take 24 hours for a TA to respond to a question). For matters that do not belong on a discussion forum, you may send an email to your lab TA and copy the professor.

Grading

What	How much
Homework	15%
REEF Quizzes	10%
Prelim 1	25%
Prelim 2	25%
Final	25%

Homework

We will have (almost) weekly homework assignments, which are to be submitted on Blackboard. Homeworks will be posted by Saturday noon and due by Friday the following week by midnight. Discussing homework with classmates is encouraged, but you *must* write up your assignments individually. You may also ask course staff for guidance/hints, but **please only ask for help on a homework problem after giving it a serious effort on your own** (which includes reading the relevant sections of the text).

More detail: You should start by working on each problem on your own, without anyone else. Then (and only after this first step), when you've identified problems that are difficult or require discussion, you may talk with others in the class (or a teaching staff member in office hours) about this. Then, after this discussion you can independently go back to writing your homework. This is very different from doing your homework side-by-side with a classmate. This policy is not just to help us evaluate people separately. Doing homework carefully on your own (which includes spending time being stumped on a problem, looking back at the book and your lecture/lab notes to clarify misunderstandings) is the best way to make sure you are actually internalizing the course material in a deep and lasting way. If you don't let yourself be stuck on a problem (before getting help), it's hard to notice areas of material that you actually should be studying more closely. If you find that you have no idea how to do any of the problems on your own, that is a good indication that you should be approaching this class differently and you should come to office hours for guidance in how to go about learning the material in this class more effectively. (Better to realize this while doing a homework than during an exam!)

Late homework policy: It can be difficult on the teaching staff to have to decide on a case-by-case basis what constitutes an acceptable or unacceptable reason for a homework to be late. Thus, we will simply not accept any late homework (and give these a 0). At the end of the semester, we will drop the *lowest two* homework scores.

Weekly In-class Quizzes with iClicker REEF Polling

There will be 5-question in class on-line quizzes once a week on the current material being covered in lecture. We will use the REEF Polling system for these quizzes. These quizzes must be taken on your smartphone, personal computer, or tablet. An iClicker can be used if you have previously purchased one for another course. REEF offers a free 14 day trial. After that you will be asked to purchase a subscription. A 6-month subscription costs $14.99. If you take the in-class quiz, you receive 75% for just participating. You will be awarded 5% for every correct answer. The lowest 3 of your in-class quizzes will be dropped. There are no make-ups.

Exams

What	Date/Time	Location
Prelim 1	Oct 4 / 7:30 pm	MLT228, MLT251, MLT253
Prelim 2	Nov 6 / 7:30 pm	WRNB25, WRNB75
Final	Dec. 10 / 7:00pm	TBA

Make-up exam policy: Requests for make-up exams must be received at least three weeks prior to the scheduled exam barring extenuating circumstances; e.g. an unexpected medical emergency. These requests must be submitted in writing, preferably via email. Requests for make-up exams will be granted in accordance with university rules. Exams for this course receive priority over any course not listed in the university evening prelim schedule.

Final Grade Calculation

You can assume that I will not curve any exam scores. However, I will take into account that sometimes we just have a bad testing day in the following way: At the end of the semester I will take the difference between your lowest prelim score and the average of your two highest prelim scores. I will add half of that difference to your lowest prelim score. After this adjustment everything will be weighted as indicated above. To be sure there are no surprises, here is the exact breakdown of how grades will be assigned at the end of the semester: 98 and up A/A+, 94-97 A, 90-93 A-, 86-89 B+, 82-85 B, 78-81 B-, 74-77 C+, 70-73 C, 65-69 C-, 61-64 D+, 57-60 D, 54-57 D-, 53 and Below F

Code of Academic Conduct

It is expected that you will adhere to Cornell's Code of Academic Integrity. If you are unfamiliar with it, please read "Guidelines for Students" at http://cuinfo.cornell.edu/aic.cfm.

Students with Disabilities

The course staff wants to make sure that we accommodate to your needs. Please provide the professor with a Student Disability Services (SDS) accommodation letter within the first three weeks of the semester so that we can be sure to accommodate accordingly.

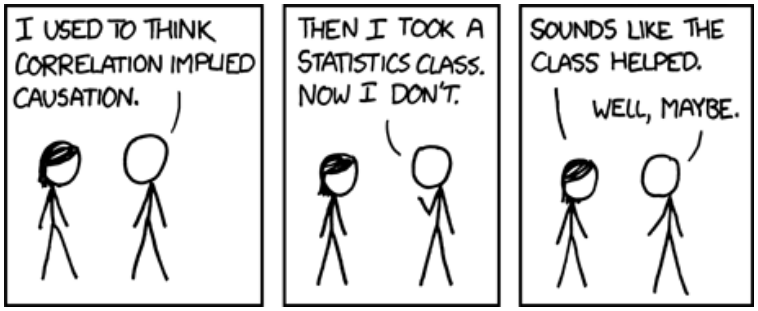

Figure 1: From the xkcd webcomic http://xkcd.com/552/