Introductory Statistics for Biology
STSCI 2150
Spring 2016, 4 credits

This course will provide an introduction to data analysis and statistical inference with an emphasis on practical use of statistics. Statistical applications include the areas of biology, medicine, nutritional science, epidemiology and environmental science. The weekly computer labs will teach graphical analysis and statistical computation using R. Emphasis will be on concepts and the careful modeling of biological data, so that statistical methods are applied properly and sound conclusions are reached.
Topics will include populations and sampling, graphical display of data, numerical methods for summarizing and describing data, probability, expectation and variance, estimation, hypothesis testing, the binomial and Poisson distributions, inference about proportions, goodness-of-fit tests and contingency tables, normal distributions and the central limit theorem, inference about the mean and variance of one or two normal populations, block design of experiments, correlation and regression.

There are no prerequisites and the course is open to all Cornell students. The course is worth four credits: three lectures and one computer lab per week. There will be weekly homework, three prelims, and a final exam. The weekly homework assignments are a mix of statistical analysis with R and problems which involve writing and hand calculations.

Textbook: *The Analysis of Biological Data* by Whitlock and Schluter (both authors are biologists). Either the 1st edition or 2nd edition are fine. This textbook is excellent – past students will vouch for this.

Class Time and Location: MWF 2:30 – 3:20, 155 Olin Hall

Prerequisites: None

Instructor: Melissa Smith, Lecturer, Department of Statistical Science
1176 Comstock Hall
ms429@cornell.edu

Computer labs   Held in the Mann Library basement computer labs:
Tues 10:10AM - 11:25AM
Wed   8:35PM - 9:50PM
Thur 11:40AM - 12:55PM
Fri   8:40AM - 9:55AM

Course Overlap   Forbidden Overlap: A student cannot receive credit for this course and for MATH 1710, SOC 3010, PSYCH 3500, ENGRD 2700, ILRST 2100, PAM 2100, AEM 2100, BTRY 3010, or AP Statistics.

Office Hours: TBA, see Blackboard. If you cannot come during office hours, you may contact me by email to arrange an appointment time.

Attendance:
Attendance at lectures is expected but not required. You are responsible for being aware of the announcements and content.

Website:
The course website is available through http://blackboard.cornell.edu/. Please register with the site and check it regularly. We will use Piazza also. This is a good venue for getting answers to questions that you have about the homework assignments.

Statistical Software:
We will be using the software package, R. This is a free package and can be downloaded from the Web. (You do not need to do this before the course has begun. We will go over it in the first lab period.)

In-class exams:
There will be three prelims. You may not bring a computer, but may bring a calculator that does not have any communication capability. *Do not bring cellphones.*

Grading Policy:
Your grade will be based on homework (16%), online quizzes (3%), lab attendance (2%), three prelims (18% each), and the final exam (25%). Homework assignments are equally weighted. The lowest score on a homework assignment will be replaced by the next lowest homework score.

Lab attendance will be taken at the first six labs. There are a total of 14 labs. Attendance at these labs is especially important in order to learn R. **You will receive full credit for lab attendance if you attend at least 5 of the first 6 labs.**

If there is a dispute about grading (a homework set or an exam), you may turn in the work with a written request for a regrade within a week of the work being returned. *All* of the work, and not just the disputed question, will be regraded.

Homework assignments will be posted on the course website and will be due one week later. Generally homework will be due on Wednesdays at 11:59 pm.

Students may discuss homework problems with one another, but only at the level of a "corridor conversation" with no notes taken. Homework that is late receives 20% off for within 24 hours late and 40% for within 24 to 48 hours late. A zero after that. If you have a *good* reason why you cannot meet a deadline, please check with one of the two Head TA's, *before* the deadline passes. In these cases some arrangement can usually be found.

Homework submission is to be done electronically through Blackboard. ***It is your responsibility to be sure that your homework was actually turned in.*** Don't just think that you turned it in. Check and then double-check that your homework was actually submitted. **Being compulsive about this would be good.** Save the Turnitin receipt that is produced when you turn in your homework.

Academic Conduct:

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit should be the student's own work.

Do NOT sign-in your friends during labs. This is a violation of the Academic Integrity. The TA's will be watching for this.

I treat violations of Academic Integrity seriously. Prior violations:

1) Student copied homework solutions on 3 assignments and claimed that they were his/her own
    > Penalty: 0 for all lab assignments
    > End result: Student failed the course
2) Student had homeworks and handouts in sight during final exam
    > Penalty: 0 for the final exam
    > End result: D in the course (no credit received) and student did not graduate with his/her class. Had to take an additional course to graduate.

All homework assignments are to be completed by students working on their own. You may discuss the homework problems with others if you wish, but only at the level of a discussion in a corridor. No notes should be taken away from such discussions.

You may not work through the solutions with other students, and you cannot share computer files. You may not discuss the homework with past students who may have knowledge of the details of the homework set. You are also not allowed to derive advantage in any way from the existence of solutions prepared in prior years, whether the solutions were former students' work or copies of solutions that had been made available by the instructors.

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

You are prohibited from buying and selling course materials that I have written. Such behavior constitutes academic misconduct.

Violations will be handled in accordance with the Code of Academic Integrity available at http://www.theuniversityfaculty.cornell.edu/AcadInteg/code.html and you can learn more at http://www.theuniversityfaculty.cornell.edu/AcadInteg/ .

If you have any questions about this policy, please ask me.

Resources for Help:

> Dr. Melissa Smith – office hours

> The grad TA's and undergrad TA's – during lab and office hours (see Bb for times)

> StatsLab – Free Stats Tutoring for Cornell Undergrads (Mon, Tues, Wed, Thurs)

> > 4:30 pm – 6:30 pm in 417 CCC

> R Help – Try "Quick R" www.statmethods.net

> DataCamp – datacamp.com (online learning modules on R)

Personal or Academic Stress:
If you are experiencing undue personal or academic stress at any time during the semester or need to talk with someone about a personal problem or situation, I encourage you to seek support as soon as possible. I am available to talk with you about stresses related to your work in my class. Additionally, I can assist you in reaching out to any one of a wide range of campus resources, including:

- Your college's Academic Advising or Student Services Office
- Cornell Learning Strategies Center at 255-6310, http://lsc.sas.cornell.edu
- Gannett Health Services at 255-5155, www.gannett.cornell.edu
- Let's Talk Drop–In Consultation and Support www.gannett.cornell.edu/Let'sTalk
- Peer Support provided by Empathy Assistance and Referral Service at 255-EARS

Disability-Related Concerns: Students with either an ongoing or short-term disability are encouraged to contact Student Disability Services (SDS) for a confidential discussion of their need for academic accommodations. SDS is located in 420 CCC building; phone number is 254-4545.

How to be Successful in this Class:

- **Read** the chapter or assigned readings before class.
- Write down the **learning objectives**.
- After class, **evaluate** yourself… did you achieve the learning objective?
- **Review** your notes. Try an example. (All the problems have solutions in the back of the book.) Ask yourself questions!
- Get a study partner or form a **study group**. Go over practice problems, toss around ideas. Explain a method to someone else. If you teach it, you will learn it.
- If you come across interesting studies or blurbs, share them with me.
- **Attend** class and lab sections.
- **Golden Rule for Success:** For every 3 hours in class, you should spend 9 hours outside of class, doing class-related work.
- *Ask questions*! Ask your classmates, ask yourself, ask your TA's, ask me.