Biol 175 Applied Biostatistics

Instructor

Prof. Sarah Gilman

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Office Location

Keck Science, Rm 13 (basement)

Office Hours

Tu. 1:30-3:30
Fr 1:00-3:00
or by appt.

***PLEASE NOTE**: Biol 175 meets more than 3 hours/week, but IT DOES <u>NOT</u> COUNT AS A LAB COURSE FOR ANY BIOLOGY MAJOR.*

Course Goals

This course is an introduction to descriptive and inferential statistics and experimental design. The goal of statistics is to help us make decisions when information is limited or uncertain. By the end of this course you should be able to:

- Correctly use basic statistical methods for both descriptive and inferential statistics
- Incorporate statistical thinking into experimental design
- Critically analyze statistical information presented in both scientific papers and the general media.

Prerequisites

Biol 43L and Biol 44L, or both semester of AISS, are strongly recommended.

Class Meeting Times

MWF 10:00-10:50, Keck Science 101

M 1:15-3:15 Roberts North 12, CMC

Final Exam Th. Dec 18th, 2pm

Text

Whitlock & Schluter. 2009. The Analysis of Biological Data. Roberts & Company Publishers

Online

Course Website: http://sakai.claremont.edu

Course Email: biol175_f14@sakai.claremont.edu (any email sent to this address will be forwarded to the whole class and archived on Sakai)

Evaluation:

Midterm Exams (2)	25%
Final Exam	25%
Weekly assignments (9)	25%
Group Projects	20%
Class Participation	5%

Class Policies

Classroom Etiquette:

Please arrive on time. Cell phones must be silent and put away in a pocket or bag. No texting, web surfing, or emailing during class.

Laptops:

If you use a laptop, I recommend disabling the wireless to avoid distractions. Please be considerate of others and remember that those behind you can read what's on your screen.

Readings:

The reading assignments are intended to provide background needed for lectures and class activities. I recommend that you complete reading assignments before coming to class.

Assignments:

You will develop and practice your statistical skills with 9 graded lab/homework assignments. You may work on the homework in groups, but you must turn in your own version of the assignment, written in your own words. Assignments will be handed out in lab and are due the following week by the **beginning** of lab, unless otherwise specified in class.

Final Projects:

You will carry out an analysis project on a question of your choosing in groups of 1-3 students. More details will follow about the project, but briefly, you will design a small study, submit a proposal and progress report collect and analyze the data and write up a results section. In addition to the final report, your group will give a short (10 min) presentation on your project during the last week of classes.

Exams:

There will be two in-class midterm exams plus a final exam. The final exam will be roughly twice as long as the midterms, and consist of a third midterm plus a cumulative final. All exams will take place in the computer classroom and will consist of multiple choice, short essay, and statistical analyses run on SPSS.

Late Assignments and Make-up Exams:

When possible, notify me ahead of time if you are unable to submit work on time or need to reschedule an exam due to illness, sports activity, family emergency, or other reasons. Late assignments will be docked 5% for each weekday late. In the case of a family or personal emergency please notify your Dean of Students.

Students with disabilities:

To request academic accommodations due to a disability, please contact your home campus' disability officer. The disability officers are:

CMC, Julia Easley: julia.easley@claremontmckenna.edu
Pitzer, Jill Hawthorne, jill_hawthorne@pitzer.edu
Scripps, Sonia De La Torre-Iniguez: SDelator@Scrippscollege.edu
Pomona, Jan Collins-Eaglin: jan.collins-eaglin@pomona.edu
HMC, Nicole Ayers: nayers@hmc.edu

Plagiarism:

I will indicate if an assignment is meant to be done cooperatively, otherwise you are expected to do your own work. **Cheating, plagiarism, and collusion will not be tolerated!** If I suspect you of cheating, I will notify your home campus.

Syllabus modification:

I reserve the right to modify this syllabus (including course schedule) during the semester as considered necessary to improve the quality of this course. Any changes to the syllabus or schedule will be clearly announced. **You are responsible for being aware of any changes.**

Class Schedule

Reading assignments refer Whitlock & Schluter, 1st ed.

Week	Lecture Topics	Practice Sessions (Monday)
1 (9/3)	W – Introduction, Biological Data, Ch 1 F – Data & Presentation Ch 1,2 (interleaf 1,2)	
2 (9/8)	M – Describing Data, Ch 3 W – Describing & Estimating Ch 3-4 F – Probabilities, Ch 5	Introduction to SPSS
3 (9/15)	M – Probabilities, Ch 5 W – Experimental Design, Ch 14 (interleaf 5,6) F – Hypothesis Testing, Ch 6 (interleaf 3)	Exploratory Data Analysis
4 (9/22)	M – Hypothesis Testing, Ch 6 ***Proposals Due*** W – Analyzing Proportions Ch 7 F – Goodness of Fit, Ch 8	Probabilities & Sampling
5 (9/29)	M – Contingency Tables, Ch 9 W – Risk & Odds, Ch 9 & additional reading on Sakai F – Catch-up & Review	Categorical Data Analysis
6 (10/6)	M – Normal distribution, Ch 10 W – One sample t-tests, Ch 11 F - More t-tests, Ch 11,12	**Exam 1**
7 (10/13)	M – Still More t-tests, Ch 12 W – Introduction to ANOVA, Ch 15, F – ANOVA, multiple comparisons, Ch 15	t-tests
8 (10/20)	M – FALL BREAK W –FALL BREAK F – Still more ANOVA, Ch 15	*Fall Break*
9 (10/27)	M - Assumptions of t-test & ANOVA, Ch 13, 15 W – Transformations & Alternate methods, Ch 13, 15 F- Correlation, Ch 16, Interleaf 4 ***Progress Report Due***	ANOVA

10 (11/3)	M – Regression, Ch 17 W – Regression, Ch 17 F – Catch-up & Review	Transformations for ANOVA/t-test
11 (11/10)	M – Regression, Ch 17 W – General Linear Models, Ch 18.1 & Sakai reading F – Blocking & Repeated Measures, Ch 18.2	**Exam 2**
12 (11/17)	M – Factorial ANOVA Ch 18.3 W – Nested & Other ANOVAs, Sakai reading ***Analysis Plan Due*** F – Analysis Plan Discussions	Regression, Correlation
13 (11/24)	M – Data Presentation (reading on Sakai) W – THANKSGIVING F – THANKSGIVING	Complex ANOVA
14 (12/1)	M – Group meetings, no class W – Group meetings, no class F – Analysis of Covariance, Ch 18.4 ***Draft Statistical Appendix Due***	Work on group project data
15 (12/8)	M – Analysis of Covariance, Ch 18.4 W – Logistic Regression F – Catch-up & Review ***Final Paper Due***	**Final Presentations**
Final Exam, Thursday Dec 18, 2pm		