

# **BIEB 100: Biostatistics Lecture & Lab**

Course Information (updated 10 February 2011)

Winter Quarter 2011

Lecture: Tues/Thurs 11:00-12:20, Solis 104

**Note that the online html version is always the current version. Changes will be there first. This pdf version may lag slightly behind.**

Lab A01: Thursday 1:00-1:50PM, Galbraith Hall 263

Lab A02: Thursday 2:00-2:50PM, Galbraith Hall 263

Lab A03: Thursday 3:00-3:50PM, Galbraith Hall 263

Lab A04: Friday 10:00-10:50AM, Galbraith Hall 263

Lab A05: Friday 11:00-11:50AM, Galbraith Hall 263

Lab A06: Friday 1:00-1:50PM, Peterson 102 – Laptops only

## **Course website:**

<http://www.biology.ucsd.edu/labs/rifkin/courses/bieb100/bieb100winter2011.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.

## **Important dates**

8 February 2011	Exam 1
10 March 2011	Exam 2
15 March 2011	Final project due

## **Grading**

Mid-terms	15% <u>each</u>
Lab attendance and participation	5%
Class attendance and participation	10%
Homework	35%
Final project	20%

## **Textbook**

Whitlock & Schluter (2009) *The Analysis of Biological Data*, Roberts & Company Publishers.

Please note: **LEARNING PYTHON WAS LISTED AS AN OPTIONAL TEXTBOOK FOR THIS COURSE. THIS BOOK WILL NOT BE USED IN THIS COURSE. PLEASE DO NOT BUY IT FOR THIS COURSE.**

## **Contact Information**

*Instructor:*

**Scott Rifkin**

Ecology, Behavior, and Evolution

Division of Biology  
Muir 2105  
sarifkin@ucsd.edu

*Teaching Assistants:*

**Allison Wu,**  
Bioinformatics & Systems Biology Program  
Muir 2105  
chw042@ucsd.edu

**Katherine LeVan**  
Ecology, Behavior, and Evolution  
Muir 2145  
kelevan@ucsd.edu

**June Snedecor**  
Bioinformatics & Systems Biology Program  
jsnedeco@ucsd.edu

**Office Hours** Please see course website site for details.

### **Labs**

**Labs are not optional.** Lab attendance counts toward your final grade. Missing more than 3 labs results in a FAIL for the whole course. Labs will be a combination of problem solving, computer assignments, and experiments. Labs A01-A05 will take place in a computer room in CLICS; students who sign up for Lab A06 must have their own laptops. The teaching assistants will be responsible for the labs.

### **Reading and homework**

I will assume you have read the assigned reading for the class period with which it is associated. For example, chapter 7 in Whitlock and Schluter is assigned for class 4. Class 4 will make more sense and we will be able to dig deeper if you have already read chapter 7. Any additional readings will be posted on the website. Some of the material in the course – for example computations for the parametric tests – will only be covered through the readings and homework. The goal of the class sessions will be more to develop concepts and clarify misunderstandings. Homework will be assigned and due in class on Tuesdays – any exceptions (particularly around exams) will be announced either in class/section or on the website. **No late homework will be accepted.** You may work together on the homeworks but are expected to write up your solutions individually. If you do work together, please write down the names of the people you work with on the top of your paper.

### **i>clickers**

We will use the i>clicker personal response system in class. If you do not already have one, you can pick the device up from the bookstore. Each clicker has a unique serial number on the back of the remote. Place a piece of scotch tape over that bar code and ID to preserve it. In order to receive credit for your votes, you will need to register your clicker online within the first two weeks of class. You must have responded to at least one question in order to complete the registration properly. Registration is at <http://www.iclicker.com/registration>. Complete the fields with your first name, last name, student ID, and remote ID. Your student ID should be the 9 digit PID on your ID card starting with A. The clickers serve a few purposes. First, they are great tools for generating data in class. Second, they give immediate

feedback to you and Professor Rifkin on whether a concept was clear or not. Third, they will be used to measure attendance and participation.

In order to get credit for attending a class, you need to click in for the majority of the opportunities. In order to get credit for class attendance you need to attend at least 14 of the non-exam classes.

**The clickers will be used as a learning tool, not an evaluation tool. Credit for clicking in does not depend on whether your answer is correct or not. Please just do your best.**

### **Software**

Homework assignments and labs will use both web applets and the statistical computer language R with the R commander graphical user interface. After week 1, it will be assumed that you have basic working knowledge of the R commander environment and know how to import and graph data. R and R commander are both free software, and we highly recommend that you install them on your personal computers to be able to use them outside of the labs.

You can download R (version 2.12.0) from here: <http://www.r-project.org/>

R commander information including links to the software and installation instructions are here: <http://socserv.mcmaster.ca/jfox/Misc/Rcmdr/>

If you do not have a personal computer, you can install and run R from a USB stick on a computer in one of the computer clusters: <http://personal.bgsu.edu/~mrizzo/Rmisc/usbR.htm>

We will also use web applets (often written in java) throughout the course. If your web browser cannot run them, you may need to install java.

### **Data**

This is a course about how to interpret data. We will use various datasets in the course including data from you, the students. We will collect data using a web form, and the appropriate link will be included with the week's homework assignment.

### **Data generating supplies**

Please bring a deck of cards, a six sided die, a foot long ruler with both inches and centimeters, and a coin to every class and lab session. We may not use them every time but we will often enough. Please also make sure you have access to a tape measure or yard/meter stick outside of class.

### **Regrades**

If an error has been made in the grading of your exam, you may submit it to the instructor within *one week* of distribution for a regrade. Do not go to a TA for a regrade. **Your exam must first be submitted to the instructor 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 exams written in non-permanent ink.**

### **Missed exams**

There will be one makeup exam during finals week. It will cover the entire course. If you must miss an exam, you will be required to provide official documentation of an unavoidable emergency (e.g. serious illness, etc.). Without such documentation, you will receive a failing grade for that exam and will not be able to take the makeup. If you miss two exams or if you are unable to provide official documentation of an unavoidable emergency, you will receive an incomplete for the course.

### **Cheating**

Students are expected to do their own work, as outlined in the [UCSD Policy on Academic Integrity](#). Cheating will not be tolerated, and we will fail any student caught engaging in academic dishonesty. 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. Because both exams are required for satisfactory completion of this course, any student caught cheating on an exam will receive a failing grade for the course. He or she may also be suspended from UCSD.

### **Computers and phones in class and sections**

Bring paper and something to write with to take notes in class. Please do not use your computers or phones or other distraction-enabled devices in class. 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 and will not receive credit for that day. Phones are only to be used for emergencies and outside the classrooms.

### **Web resources**

The course will be using several resources on the web. The two portals are the class website (url at the beginning of this syllabus) and the class wiki. Instructions for accessing the wiki can be found at: <http://iwdc.ucsd.edu/password.shtml>. Your USERID and Password for your UCSD email account should work. However, if you are a recent transfer student or do not yet have a UCSD email account, we will need to issue you a password. If you experience problems, please contact: [iwdc@ucsd.edu](mailto:iwdc@ucsd.edu).

**BIEB 100 – Winter 2011**  
**Course schedule.**  
**Updated 31 December 2010**

<b><u>Week 1</u></b>		<b>Logic of statistics and hypothesis testing</b>
4 Jan	Class 1	Introduction to statistical concepts; overview of course
6 Jan	Class 2	Logic of hypothesis testing; randomization tests - how many times should a thing happen? (categorical variables)
6-7 Jan	Lab 1	<i>Introduction to R and R commander</i>
<b><u>Week 2</u></b>		<b>One proportion tests</b>
11 Jan	Class 3	Logic of estimation and plausible values; randomization tests – how many times should a thing happen? (categorical variables)
13 Jan	Class 4	Parametric tests – how many times should a thing happen? (categorical variables)
13-14 Jan	Lab 2	
<b><u>Week 3</u></b>		<b>Goodness of fit</b>
18 Jan	Class 5	Modeling/randomization tests – comparing frequency data to a prediction (categorical variables)
20 Jan	Class 6	Parametric tests – comparing frequency data to a prediction (categorical variables)
20-21 Jan	Lab 3	
<b><u>Week 4</u></b>		<b>Association</b>
25 Jan	Class 7	Randomization tests – testing association/independence (categorical variables)
27 Jan	Class 8	Parametric tests – testing association/independence (categorical variables)
27-28 Jan	Lab 4	
<b><u>Week 5</u></b>		<b>Normality</b>
1 Feb	Class 9	Experimental design – what conclusions can be drawn?
3 Feb	Class 10	Is it normal to be normal?
3-4 Feb	Lab 5	
<b><u>Week 6</u></b>		<b>Correlation</b>
8 Feb	Class 11	Exam 1 (through association)
10 Feb	Class 12	Randomization and parametric tests – testing association/independence (numerical variables)
10-11 Feb	Lab 6	
<b><u>Week 7</u></b>		<b>Two groups</b>
15 Feb	Class 13	Randomization tests – comparing two groups (numerical variables)
17 Feb	Class 14	Parametric tests – comparing two groups (numerical variables)

<i>17-18 Feb</i>	<i>Lab 7</i>	
<b><u>Week 8</u></b>		<b>Two or more groups</b>
22 Feb	Class 15	Randomization tests – comparing two or more groups (categorical explanatory variable, numerical response)
24 Feb	Class 16	Parametric tests – comparing two or more groups (categorical explanatory variable, numerical response)
<i>24-25 Feb</i>	<i>Lab 8</i>	
<b><u>Week 9</u></b>		<b>Regression</b>
1 Mar	Class 17	Modeling – predicting one thing from another (numerical explanatory variable, numerical response)
3 Mar	Class 18	Parametric tests - predicting one thing from another (numerical explanatory variable, numerical response)
<i>3-4 Mar</i>	<i>Lab 9</i>	
<b><u>Week 10</u></b>		<b>Partitioning variation</b>
8 Mar	Class 19	Modeling/testing - predicting one thing from others (two categorical explanatory variables + interaction, numerical response)
10 Mar	Class 20	Exam 2
<i>10-11 Mar</i>	<i>No labs</i>	
<b><u>Week 11</u></b>		<b>Final projects</b>
15 Mar		Final projects due