

## **Biology 651: Advanced Biostatistics II Spring 2016**

Meeting Times: Mon, Wed 10:00 am -11:15 pm  
Meeting Location: LF137  
Credit Hours: 3  
Prerequisites: Bio650 or previous advanced course in Biostatistics  
Software: R

**Instructor:** Dr. Gary Cobbs  
Office: Life Science Building (LF) room 224  
Phone: (502) 852-5937  
e-mail: gacobb01@louisville.edu  
Office Hours: T, Th, F 2:30-3:30 PM

**Course Description:** Biology 650 is a second semester of Biostatistics for graduate students in the life sciences. It is an applied course and will involve interpretation of experimental data using statistical models. All the examples used are biological. General topics covered include Experimental design and the ANOVA, ANCOVA, The General Linear Model, Generalized Linear Models, Multivariate analysis, Logistic analysis, Logistic regression, Log-linear models, Multiple testing techniques.

**Method of evaluation:** There will be two take home exams, each worth 100 points. Letter grades for the course will be determined from the total points from the two exams. There will be numerous homework assignments throughout the course that will not have any point value.

**Policy on Instructional Modifications:** Students who have a disability or condition which may impair their ability to complete assignments or otherwise satisfy course criteria are encouraged to meet with the course instructor(s) to identify, discuss, and document any feasible instructional modifications or accommodations. The student should notify the instructor no later than the end of the second week of the semester/term in which the course is offered or no later than the end of the second week after such a disability or condition is diagnosed, whichever occurs earliest. The student may contact the Disabilities Resource Center for information and auxiliary aid.

### **Title IX/Clery Act Notification**

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain **confidential** support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).

Disclosure to **University faculty or instructors** of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is **not**

**confidential** under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.

For more information, see the Sexual Misconduct Resource Guide

(<http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>).

## Biology 651, Biostatistics II Spring, 2016

### Tentative Lecture Schedule

- I. Introduction to R
- II. Models with random effect factors
  - A. Random versus fixed interpretation of a factor
  - B. Designs with one random effect factor
  - C. Designs with one random factor crossed with one fixed factor (mixed model)
  - D. Designs with two random factors
- III. Nested designs
  - A. Simple nested design
  - B. Two level nested design
  - C. Variations of the nested design
- IV. Split plot designs
  - A. Within plot and between plot effects
  - B. Complete block design
  - C. Incomplete block design
- V. Repeated measures designs
- VI. Regression models with plot effects
  - A. Models with single covariate value for each plot
- VII. Correlation Analysis
  - A. Multiple correlation
  - B. Partial correlation
- VIII. Multiple testing
  - A. Methods controlling the experimentwise error rate
  - B. Methods controlling the False discovery rate
- IX. Principle components analysis
- X. Correspondence analysis