

Instructor:

Dr. Jason Hoeksema (318 Shoemaker, 662-915-1275, hoeksema@olemiss.edu)

Lecture: T / Th 8:00-9:15 a.m. (Shoemaker Hall Rm. 225)

Lab: T / Th 9:30-10:45 a.m. (Shoemaker Hall Rm. 225)

Catalog Description: A course on analysis of biological data using parametric and nonparametric statistics.

Required course readings:

- *Discovering Statistics Using R*, by Andy Field, Jeremy Miles, and Zoe Field. 2012, Sage.
- other materials as assigned

Course grading: Grades will be based on in-class quizzes (10%), lab exercises and associated homework (25%), midterm exam (20%), in-class presentation (10%), and final exam (35%). Grading scale: >90% = A, 80-89% = B, 70-79% = C, 60-69% = D, <60% = F (plus/minus scale)

Learning objectives:

By the end of the course, students will be able to:

- Design efficient sampling schemes and experiments for biological research
- Describe and summarize data using descriptive statistics and graphics
- Conduct inferential statistical tests on a wide variety of data types
- Interpret, explain, and present the results of statistical tests

Course format:

Lectures introduce statistical concepts and approaches to data analysis, and in-class quizzes test understanding of lecture material & readings throughout the semester. Lab exercises and associated homework assignments allow students to practice applying concepts and approaches to analysis of real data on computers, using the open-source statistical software R.

Schedule of lecture topics (relevant chapters from Field et al. in parentheses)

26 Aug Course overview; Intro to Statistics (Ch. 1)

28 Aug Intro to Statistics continued (Ch. 2) and Introduction to R (Ch. 3)

2 Sep Exploring Data with Graphs (Ch. 4)

4 Sep Exploring Data with Graphs (Ch. 4) continued

9 Sep Correlation (Ch. 6)

11 Sep Correlation (Ch. 6) continued

16 Sep Regression (Ch. 7, pp. 245-260)

18 Sep Regression (Ch. 7, pp. 245-260) continued

23 Sep Multiple Regression (Ch. 7, pp. 261-end)

- 25 Sep** Exploring Assumptions (Ch. 5) and Randomization Tests
- 30 Sep** Logistic Regression (Ch. 8, pp. 312-345)
- 2 Oct** Logistic Regression (Ch. 8, pp. 312-345) continued
- 7 Oct** Power and sample size estimation for correlation and regression
- 9 Oct** Review / catch-up; introduce take-home Midterm Exam
- 14 Oct** take-home Midterm Exam due; Comparing two means (Ch. 9)
- 16 Oct** Categorical Data (Ch. 18)
- 21 Oct** Comparing several means: ANOVA (GLM 1) (Ch. 10)
- 23 Oct** Comparing several means: ANOVA (GLM 1) (Ch. 10) continued
- 28 Oct** Comparing several means: ANOVA (GLM 1) (Ch. 10) continued
- 30 Oct** Analysis of covariance: ANCOVA (GLM 2) (Ch. 11)
- 4 Nov** Factorial ANOVA (GLM 3) (Ch. 12)
- 6 Nov** Power and sample size estimation for t-test and ANOVA/ANCOVA
- 11 Nov** Repeated-measures Designs (GLM 4) (Ch. 13)
- 13 Nov** Repeated-measures Designs (GLM 4) (Ch. 13) continued
- 18 Nov** Mixed designs (GLM 5) (Ch. 14)
- 20 Nov** Multi-level linear models (Ch. 19)
- 24-28 Nov** Thanksgiving Holidays
- 2 Dec** Review, practice, work on projects for presentations
- 4 Dec** Student presentations
- 9 Dec (Tuesday), 8 a.m.** Final Examination (take-home exam due by 11 a.m. today)

Academic misconduct: Students are responsible for abiding by the university's policies on Academic Conduct and Discipline, which are available on the university website. Academic misconduct will not be tolerated in this course, and possible sanctions for academic misconduct include: failure on the work in question, course grade reduction or failure of the course, disciplinary probation, or suspension or expulsion from the University.

Absences from class: If you have an emergency or official University activity that will cause you to miss class, it is essential that you contact the instructor prior to the absence if possible, either by e-mail or phone (see above for contact info) to arrange an alternative option. In-class quizzes and other graded work can only be made up under special circumstances when they have been missed due to a medical or family emergency or official University activity (documentation required).

Cell phones, texting, e-mail and web-browsing in class and meetings: Turn off your phones and PDAs before entering class or a meeting with an instructor. Computers are encouraged in class, but may only be used for course work. Texting, e-mailing, internet browsing, and making phone calls are all **strictly prohibited** during class and meetings with the instructor.