

Biostatistics

OCOR-5603

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Office Hours: WebCT or by Appointment

Credit: 3 Hours

Required Course Text

- Online Statistics: An Interactive Multimedia Course of Study. This is **FREE**.
<http://onlinestatbook.com/>

Required Course Text

- Lane, David. (2002) Hyperstat (2nd Edition). Cincinnati, OH: Atomic Dog Publishing.
- To order the book visit <http://www.atomicdogpublishing.com/home.asp>. You must register using the Course Registration ID: **1615223608030**.
- Online Edition: \$39.70 or Paperback + Online Edition: \$56.70.

Required Course Statistical Package

- JMP® 7 (06-Month License). <http://estore.e-academy.com/index.cfm?loc=jmp/main>.
- Purchase the 6-month version. The cost is \$29.95.

Course Objectives

This is an introductory statistical course for marine biology/oceanographic science majors. The course will introduce elementary methods for presenting biological data in summary form, analyzing biological data, and designing experiments. It is not a mathematics course and so will not stress derivations of formulae but, rather, will emphasize the application of statistical ideas and methods to the design and interpretation of biological experiments and comparative data. The student will be able to assess a situation involving data analysis, state the nature of the biological question and the null and alternative hypotheses proposed, decide on the correct statistical procedure to test the null hypothesis and the assumptions of the test used, calculate the statistic, assess its statistical significance, and interpret the data in light of the calculated result. Assessment of a student's performance will be done through the use of problem sets, quizzes, and a final exam. At the completion of the course, students will be able to:

- Calculate summary statistics
- Calculate common probability distributions and apply those calculations to solve problems based on biological studies
- Randomly allocate experimental units to treatments and apply this technique to solve problems based on biological studies
- Calculate the distribution of observations about the mean based on the assumption of normality and apply those calculations to solve problems based on biological data
- Calculate the distribution of sample means about the mean and apply those calculations to solve problems based on biological data
- Design simple biological experiments
- Compare two means (from paired and unpaired data) using both parametric and non-parametric methods and use those methods to test hypotheses
- Analyze categorical data to test both goodness-of-fit and contingency hypotheses
- Compare more than two means using analysis of variance methods and use those methods to test hypotheses derived from both single-factor and two-factor experimental designs
- Calculate least-squares regression lines and apply those calculations to solve problems based on biological studies.

Course Requirements

- Twelve quizzes from the David Lane textbook are assigned. The quizzes are designed to be taken at your pace. As such, although the quizzes are listed in the order of presentation topic they are not due until **June 22, 2008**.
- Three problem sets are assigned throughout the course. They are intended to serve as practice for topics covered in class. The problem sets will involve the use of JMP. Problem sets are due on the date listed in the course syllabus. Students will submit their work using **MS Word, Pages or as a PDF File**. I will not accept submission in other formats. Answers must be typed, double-spaced, using correct grammar and punctuation, including all relevant charts and graphs. Assignments submitted after the due date will receive a zero.
- A final exam is assigned at the end of week 12. The final exam's due date is June 23, 2008. Students will submit their work through the WebCT e-mail service. Students will submit their work using **MS Word, Pages or as a PDF File**. I will not accept submission in other formats. Answers must be typed, double-spaced, using correct grammar and punctuation, including all relevant charts and graphs. Final exams submitted after the due date will receive a zero.
- Seven Eluminate (E) sessions are offered. The E sessions are held on Mondays, as indicated in the **course outline**, from 7:00-8:00 P.M., EDT. The first E session is **MANDATORY (April 14, 2008)**. We will discuss the course requirements and assignments. If you cannot attend you must contact me before the E session. Failure to do so will result in a failure for the course.
- An Assignment Discussion Board will be offered throughout the course. Students are strongly encouraged to post questions and provide answers to the posting. All postings will involve the graded assignments. Students may not post answers to the graded assignments. I will also post the answer to the assignments on this board. You are NOT required to participate with the Assignment Discussion Board.

Grading Scheme

Your grade is the weighted **harmonic** mean of your assignments:

Quizzes	30%
Exercises	30%
Final Exam	40%

Course Outline

Week	Date	Lane Readings	Lane Assignment	Problem Set	E Session
1	Apr 7, 2008	Chap. 1	Quiz Chapter 1		
2	Apr 14, 2008	Chap. 2-3	Quiz Chapter 2 & 3		April 14 7-8 PM EDT
3	Apr 21, 2008	Chap. 4	Quiz Chapter 4	Problem Set 1 due--4/19	April 21 7-8 PM EDT
4	Apr 28, 2008	Chap. 5	Quiz Chapter 5		
5	May 5, 2008	Chap. 6	Quiz Chapter 6		May 5 7-8 PM EDT
6	May 12, 2008	Chap. 7	Quiz Chapter 7	Problem Set 2 due--5/9	
7	May 19, 2008	Chap. 8	Quiz Chapter 8		May 19 7-8 PM EDT
8	May 26, 2008	Chap. 9	Quiz Chapter 9		
9	Jun 2, 2008	Chap. 10	Quiz Chapter 10	Problem Set 3 due--5/30	June 2 7-8 PM EDT
10	Jun 9, 2008	Chap. 12	Quiz Chapter 12		June 9 7-8 PM EDT
11	Jun 16, 2008	Chap. 15	Quiz Chapter 15		June 17 7-8 PM EDT
12	Jun 23, 2008	Final Exam		Final Exam due--6/27	