

BIostatISTICS - BIO 474

Fall 2007

Instructor:

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Lee Drain Building, Room 114
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Lecture: M,W,F 0900 - 1000 h
Lee Drain Building 130

Office Hours: Office hours are posted on my office door. Scheduling an appointment to see the instructor is recommended.

Textbooks:

Zar, J.H. 1999. *Biostatistical Analysis*. Prentice Hall, Inc. Englewood Cliffs, New Jersey.
Hampton, R.E. 1994. *Introductory Biological Statistics*. Waveland Press, Inc. Long Grove, Illinois. *Not required but a recommended text.*

COURSE DESCRIPTION

Biostatistics (BIO 474) is a course that introduces biologists to basic statistical methods and their application to real biological problems. As for any good course in *Biometry*, students will: become familiar with statistical terminology; be introduced to concepts in experimental design and hypotheses testing; and learn statistical procedures for describing and summarizing data. More importantly, this course will focus on identifying different experimental designs and learning which statistical procedures are most appropriate for data analyses. Thus this course in *Biometry* will focus on the application of statistics in biology and not the mathematical theory and derivation of statistical equations. Topics will include descriptive statistics, probability, distributional analyses, analysis of variance, correlation and regression, and frequency analysis. The use of computers and statistical software will be greatly encouraged in this course.

Prerequisites for this course include MTH 170 and 8 hours of biology course credit.

STUDY AIDS AND TECHNIQUES

The schedule of lecture topics and exams are attached. Success in this course is directly proportional to the amount of time and effort dedicated to reading course material and studying. You should adopt a study schedule that allows for **three hours of study for each hour of lecture**. Textbook reading assignments are most important and should be completed prior to lecture. Each chapter of the text book ends with a set of statistical *EXERCISES* that should receive your attention. These exercises will help you evaluate your understanding of course material and may be used in *lecture quizzes*. If you do not adopt these study practices, you may gain limited experience from this course which will be reflected in your final course grade.

ATTENDANCE AND PERFORMAMANCE

Students are expected to attend every lecture. A student's performance on lecture exams will greatly reflect class attendance. Examinations will test your understanding of material covered and discussed in lecture. All material discussed in lecture may or may not be addressed in your text. Thus, lecture information is crucial for complete preparation for examinations and the text and assigned readings should be used in preparation for lecture.

QUIZZES AND EXAMINATIONS

There will be a total of 10 Quizzes (10 points each) given over the course of the semester. These quizzes are unannounced but are always given at the end of a Friday lecture period. These quizzes will address any lecture material presented since the last quiz and will help evaluate your understanding of statistical concepts in preparation for examinations.

There will be a total of two in-class Examinations (100 points each) which will assess your knowledge and understanding of lecture material and particular topics presented in the textbook. A comprehensive take-home final exam (200 points) will be given on the last day of scheduled classes to be completed during the scheduled week of final examinations. This final examination will evaluate each student's ability to apply the concepts taught over the semester to real biological problems.

MISSED EXAMINATIONS

Absence from an exam due to an unexcused absence will result in a grade of zero for that exam. If you miss an examination for medical reasons, an excused family emergency, or official SHSU business, a statement of your illness signed by your attending physician or appropriate official documentation will be required. Documentation for excused absences must be provided to the instructor no later than the next class meeting. Upon providing this documentation, you will be permitted to take the exam during this class meeting or receive the grade of zero for that exam.

GRADING

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|--|---------------------------|
| Exam I | 100 points (16.6%) |
| Exam II | 100 points (16.6%) |
| Final Comprehensive Exam | 200 points (33.3%) |
| 10 Quizzes (10 pts.) | 100 points (16.6%) |
| <u>10 Homework Assignments (10 pts.)</u> | <u>100 points (16.6%)</u> |
| Course Point Total | 600 points |

Grades are based on the total number of points earned divided by the total possible number of points in this class (i.e. 600 points). Student grades will be calculated using the following grading scale in which $A \geq 90\%$, $B = 80 - 89\%$, $C = 70 - 79\%$, $D = 60 - 69\%$, and $F \leq 59\%$.

Students taking this undergraduate course in biostatistics for graduate credit will be required to complete additional problem sets on the Final Comprehensive Exam. This additional work and problem sets will evaluate a student's understanding and mastery of course material at the graduate level.

ACADEMIC DISHONESTY

Regulations and responsibilities stated in the *Student Code* and *Faculty Handbook* will be followed in the event of academic dishonesty.

Specific Notes and Codes of Conduct for this Course: Much of the work for this course is completed outside of class and independently (*i.e.* homework assignments and take-home examinations). You will also be allowed to use your statistical tables during in-class exams. Thus the following rules will be enforced:

- 1) Although you are encouraged to study in groups, all outside-of-class course assignments **must** be completed independently. You may not consult with other professionals (*i.e.* students, graduate students, or professors) regarding answers to outside-of-class course assignments.
- 2) You may **not** place notes on your statistical tables that can be used as an aid during exams (*e.g.*, formulas and definitions). I reserve the right to inspect all tables during or after exams.

Students taking this course are professional biologists and dishonesty in any form should be of concern to all professionals. As may be apparent, I take professional standards of conduct seriously. Students having specific knowledge of behavior that compromises our ethical standards and professionalism, should see me immediately. Misconduct and disrespect for academic professionalism or failure to report such behaviors will result in those students receiving a grade of “F” in this course and may be brought to Academic Council for dismissal from the University.

WITHDRAWAL POLICY

If grades of W(P), W(F), or I, are requested, University policy **will be** followed.

STUDENTS WITH DISABILITIES

Students who have disabilities that may prevent them from fully demonstrating their abilities should contact the instructor as soon as possible to discuss the accommodations necessary to facilitate full participation and to ensure the each student's educational opportunity.

DISCRETIONARY NOTE

This syllabus is subject to change at the discretion of the instructor.

Syllabus

| Week | Date | Topic | Textbook Readings |
|------|-----------------------------|--|--|
| 1 | 8-21 8-23 8-25 | Introduction and Basic Definitions Accuracy and Significant Figures Frequency Distributions and Graphing | Chapter 1 |
| 2 | 8-28 8-30 9-1 | Populations and Samples “ ” | Chapter 2 |
| 3 | 9-4 9-6 9-8 | Measures of Central Tendency and Dispersion “ ” | Chapters 3 & 4 |
| 4 | 9-11 9-13 9-15 | Probability “ ” | Chapter 5 |
| 5 | 9-18 9-20 9-22 | Binomial Distributions Poisson Distributions Normal Distributions | Chapter 24 Chapter 25 Chapter 6 |
| 6 | 9-25 9-27 9-29 | Central Limit Theorem Confidence Limits Hypothesis testing | Chapters 7 - 9 |
| 7 | 10-2 10-4 10-6 | EXAM 1 Analysis of Variance “ | Chapters 1 - 9 Chapter 10 |
| 8 | 10-9 10-11 10-13 | Multiple Comparisons “ “ | Chapter 11 |
| 9 | 10-16 10-18 10-20 | Two-Factor Analysis of Variance “ ” | Chapter 12 |
| 10 | 10-23 10-25 10-27 | Data Transformations Multiway Factorial Analysis of Variance Nested Analysis of Variance | Chapter 13 Chapter 14 Chapter 15 |
| 11 | 10-30 11-1 11-3 | Multivariate Analysis of Variance “ ” | Chapter 16 |
| 12 | 11-6 11-8 11-10 | Simple Linear Regression and Correlation “ ” | Chapters 17 - 19 |
| 13 | 11-13 11-15 11-17 | Multiple Regression and Correlation “ ” | Chapter 20 |

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| 14 | 11-20 11-22 11-24 | EXAM 3 Thanksgiving Holiday Thanksgiving Holiday | Chapters 10 - 20 |
| 15 | 11-27 11-29 12-1 | Testing for Goodness of Fit “ Contingency Tables | Chapters 22 - 23 |
| 16 | 12-4 12-6 12-8 | Nonparametric Techniques “ FINAL COMPREHENSIVE EXAM ASSIGNED Study Day | Assigned Readings |
| 17 | 12-13 (1000 h) | FINAL COMPREHENSIVE EXAM DUE DATE | |