

Biostatistics (HS167)

Fall 2003

San Jose State University

Dept. of Health Science

- Prerequisite At least two years of high school algebra.
Undergraduates: Satisfactory completion of the Entry Level Math requirement.
- Website www.sjsu.edu/biostat
- Instructors Professor: B. Gerstman. (see www.sjsu.edu/faculty/gerstman for contact information and office hours.
Graduate Assistant: Jane Pham (contact information will be distributed in class)
- Course organization This course has a weekly lecture and a separate lab. Lecture meets on Tuesdays from 3:00-4:15. There are two lab sections this semester, one immediately following lecture and another one on Wednesday afternoon. You should attend lecture and complete your lab work each week. Weekly assignments are handed in for grading at the beginning of each lecture. There are two midterms and a cumulative final.
- Lecture HS167(1) T 1500–1615 (code: 43018) in HB407
- Labs HS167(2) T 1630–1745 (code: 43019) in MH321
HS167(3) W1200–1315 (code: 43020) in MH321
~~HS167(4) R1500–1615 (code: 61770) cancelled~~
- Final exam T 12/16/03 1445–1700. The final exam is cumulative.
- Materials
- Gerstman, B., & Innovera M. (2003). *HS167 Course Reader. (Lecture Notes.)* Available at Maple Press, 481 E. San Carlos Ave., San Jose, CA. Tel: 408 297-1000.
 - Gerstman, B. *HS167 Lab Manual*. Available at Maple Press.
 - Inexpensive scientific calculator (e.g., Texas Instrument 30, approximately \$10).
 - Quadrille ruled composition notebook (for your *Procedure Notebook*).
 - An IBM formatted floppy disk.
 - *Optional (Recommended) Software*: Any version of SPSS Statistical Software. There are two reasonable ways to purchase this software. These are: (1) Purchase the text *Ready, Set, Go Student Guide to SPSS® 11.0 for Windows® with Supplemental SPSS Student Software* by Pavkov& Pierce (New York: McGraw-Hill, 2002). The ISBN for the book is 0-07-283007-7. The ISBN for the software is 0-07-292363-6. For about \$30 you will get an instructional manual and the student version of SPSS. (This is the least expensive way to get Student SPSS.) The Student version of SPSS is limited to using 50 variables and 1500 observations, but is sufficient for all we do and is functional for most modest data projects. (2) *SPSS Graduate Pack*. The SPSS Graduate pack is the full version of SPSS software sold to students at the greatly reduced price of about \$180. (The full version is about \$1K.) You can get the SPSS Graduate Pack at the campus store or through www.journeyed.com for Windows or Macintosh. Recommended for serious data users only.

Please see the course website for the schedule of topics and exams!

Objectives

This course is intended as an upper division and introductory graduate class in biostatistics. It focuses on the analysis and interpretation of data, especially nonexperimental data, in humans. Unlike other introductory statistics courses, there is an emphasis on exploratory data analysis and estimation. Specific objectives include:

- 1 Measurement—To understand the centrality of measurement; identify measurements scales; to understand the importance of data quality; to select a simple random sample from a defined population.
- 2 Stem-and-Leaf Plots and Frequency Distributions—To construct stem-and-leaf plots; to use stem-and-leaf plots to describe the shape, central location, and spread of a distribution; to construct frequency tables.
- 3 Summary Statistics—To calculate and interpret measures of central location and spread; to compile an interpret five-point summaries; to draw and interpret boxplots.
- 4 Probability—To understand the nature and use of probability (logical, empirical, subjective); to calculate and interpret binomial probabilities; to calculate and interpret normal probabilities and percentiles.
- 5 Confidence Intervals for a Mean—To understand basic theories of sampling variability (e.g., the central limit theorem, the laws of large numbers, etc.); to differentiate between parameters and estimators; to calculate and interpret confidence intervals for means; to calculate sample size requirements for achieving a stated level of precision when estimating a mean.
- 6 Introduction to Statistical Testing—To understand the statistical testing method (H_0 , H_1 , I error, type II error, α , β , confidence, power); to test a sample mean against an expectation (both) when the population standard deviation is known and when it is estimated from the sample standard deviation.
- 7 Paired Samples and their Differences—To describe paired differences using methods learned earlier in the course (e.g., stem-and-leaf plot); to calculate a 95% confidence interval for a mean difference; to test a mean differences for significance; to calculate and interpret the power of a t test.
- 8 Independent Samples and their Differences—To describe independent samples using method learned earlier in the course (e.g., to calculate and interpret 95% confidence intervals for independent mean differences; to test the a mean difference for significance; to determine the sample size needed to perform an independent t test with 80% power.
- 9 Inference About a Proportion—To calculate a 95% confidence interval for a population proportion; to test a proportion for significance (normal approximation method); to determine the sample size needed to estimate a proportion with given precision.
- 10 Cross-Tabulations—To compare independent proportions; to calculate and interpret a chi-square tests of association.

Grading

Grading is based on a weighted average of homework and exam scores with weight as described in the table below.

Example of a Grade Calculation (Notice weights of each component.)

Component	% Earned	×	Weight	=	Points earned
Homework Avg.	94	×	0.45	=	42.3
Midterm 1	90	×	0.15	=	13.5
Midterm 2	80	×	0.15	=	12.0
Final	85	×	0.25	=	21.3
					89.1
Grade:					B+

Grade cutoffs are as follows:

100–97% A+	89–87% B+	79–77% C+	69–67% D+	Below 60% F
96–93% A	86–83% B	76–73% C	66–63% D	
92–90% A!	82–80% B!	72–70% C!	62–60% D!	

SJSU policy on academic dishonesty

San Jose State University has established a policy on academic dishonesty which is intended to prevent cheating and plagiarism. The policy is available on the SJSU web site under "Academic Programs." Students are referred to the policy for details. It is recommended that students familiarize themselves with the definitions and sanctions of the policy as adopted by the University Community. Students enrolled in this course are expected to know and abide by this policy. Violations of this policy or the honor code will result in the failure of the course and possibly additional sanctions as permitted under the Policy of Academic Dishonesty. An *honor code* is a code of conduct adopted by all students that, individually and collectively, they will not give or receive unethical aid in the preparation of reports, projects, papers, and other work that is to be used as a basis for grading. This includes copying from another's examination paper or allowing another to copy from one's own paper, various forms of plagiarism, revising and resubmitting a quiz, examination or assignment for grading without the instructor's knowledge and consent. Representing as one's own work, the work of another, giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted will be considered violations of this code. Any student registered in, and taking this class for a grade agrees to abide by this code as a condition of their taking the class and receiving a grade.

Homework Policies

1. It is essential for you complete each homework and hand it in on time. Assignments are due at *beginning* of lecture each Tuesday. If for some reason you cannot attend class the day the assignment is due, please make arrangements with the Professor in advance for an alternative form of delivery. *No credit will be given for late assignments.*
2. Please print the HW Exercises *the* day they are posted, and not before.
3. Start work on the assignment as soon as possible; you have a full week to complete the assignment, but do NOT procrastinate.
4. Questions about homework assignments may be sent to the Yahoo! discussion group. To join the discussion group, send a message to hs167-subscribe@yahoogroups.com. This will allow you to send questions to hs167@yahoogroups.com. When you send a message to this address, everyone on the list will receive a copy of your message, so please adhere to proper netiquette (see <http://www.sjsu.edu/depts/ughealth/ListServ.htm> for advice on proper netiquette.) The Yahoo! Groups software list has several advantages compared to old fashioned "ListServe" software. For example, you can sign up to turn off receipt of messages, receive daily digests of messages, and use the website groups.yahoo.com/group/hs167 to view messages. To make full use of these Yahoo! Groups function, you must have a Yahoo! account ID attached to your group membership (see
5. Do all assigned problems. Answers to odd numbered problems are linked to the exercise page. Only a sample of even numbered exercises will be graded. (You may submit even numbered exercises only.)
6. Graded assignments are returned via the pick-up slot in front of the lab.
7. You may work alone or in pairs. *If you work in pairs, you must submit one assignment per pair.* The instructor reserves the right to require you to turn in individual assignments if he or she believes working in pairs is not an accurate reflection of individual student work.
8. Avoid plagiarism! "Academic dishonesty defrauds all those who depend upon the integrity of the University, its courses, and its degrees. In a broader sense the public is defrauded if faculty knowingly or unwittingly allow dishonest acts to be rewarded academically" (SJSU academic policy F88-10).
9. Use judgement when reporting results.
10. Use judgement and the guidelines discussed in class when reporting results.
11. Always remember to interpret your results in plain English.
12. Completion of all assignments (on time) is essential for successful completion of the course.