

**Department of Epidemiology and Biostatistics
College of Public Health
University of Georgia**

**BIOS 2010-2010L
Biostatistics for Public Health Sciences
Fall 2009**

Course Information

Instructor: Sangwook Kang
Office Location: 129A Coverdell Center
Phone: (706)583-0211
Email: skang@uga.edu
Office Hours: Thursday, 11:00am - 1:00pm, or by appointment
Teaching Assistants: Arun Lukose alm@uga.edu

Course Meeting Time and Location

LECTURE

Room: 114 Park Hall
Day: Tuesday, Thursday
Time: 09:30 - 10:45am

LAB SECTIONS

Room: 370 Miller Learning Center
Call # 83-441: Friday 9:05 - 9:55am,
64-849: Friday 10:10-11:00am,
63-440: Wednesday 2:30 – 3:20pm,
24-850: Wednesday 3:35 – 4:25pm

Textbooks and Other Required Course Material

Pagano, M., and Gauvreau, K. 2000. *Principles of Biostatistics, 2nd Edition*. Duxbury Press: Belmont, California

Software: Minitab (available in xxxxx. Students may either purchase this software for \$99.00, or rent it for the semester for \$29.00. To purchase or rent Minitab, see <http://www.minitab.com/education/semesterrental/default.aspx>)

Lecture notes, lab materials, data sets and announcements will be posted on UGA eLearning Commons (Blackboard).

Course Description

Basic concepts of biostatistics with applications in public health and biomedicine are considered. Emphasis is given to design of public health surveys and biomedical experiments, and drawing conclusions for statistical analyses. Topics of discussion include exploratory data analysis including descriptive statistics and graphical summaries, elements of probability, design of public health studies, one- and two-sample tests, analysis of contingency tables, and simple linear regression. All biostatistical concepts and procedures will be illustrated using case studies, drawing data from public health and biomedicine.

Course Learning Objectives

The successful student should be able to produce graphical summaries of data, understand the principles of statistical inference including parameter estimation and uncertainty assessment, understand the importance of randomization in public health surveys and biomedical experiments, communicate the results of biostatistical analyses, draw substantive conclusions from the results of hypotheses tests, distinguish between prospective and retrospective studies, and understand the use of statistical software.

Course Requirements for Grading Purposes

Homework:

- There will be roughly one homework assignment every two weeks.
- Homework assignments are designed to give you an opportunity to assimilate the course material, to understand statistical software required for statistical analyses, and to demonstrate your understanding of the results of those analyses.
- For all assignment requiring the use of the computer, attach a copy of your Minitab program and output to the end of those assignments. However, all answers are to be given on a separate sheet of paper.
- In general, only hard copy of the homework is accepted, however, under special circumstances, you may send your homework by e-mail in a PDF format.
- All homework assignments are due at the beginning of the class period on the date on which they are due. No delay will be allowed.
- Students are encouraged to work together on homework, but copying someone else's work always an academic honesty violation.
- In the Computer Labs you will learn how to use the Minitab statistical software to implement statistical analyses of biomedical and public health data.

Quiz:

- There will be roughly one quiz every two weeks.
- Each quiz and homework will be weighted equally for final grading.

Exams:

- All exams are open book, closed notes exams. For each exam, you will be permitted to bring one (midterm exams) and three (final exam) letter-size sheet(s) of paper (front and back) containing any notes you may desire. In addition, a calculator should be brought to

each in-class exam.

- You must contact the instructor in advance if you are unable to take an exam at its scheduled time. Arrangements may then be made for a make-up exam.
- There will be two midterm exams and a final exam. All exams will be in-class exams. Midterm and final exam dates are summarized in the following:
 Midterm 1 (Tuesday, September 29, 9:30 – 10:45 am: in-class),
 Midterm 2 (Thursday, October 29, 9:30 – 10:45 am: in-class),
 Final (Tuesday, December 15, 8:00 – 11:00 am: in-class)

Topical Outline - Lecture

Date*	Topic of Class	Reading
AUG 18	Overview and Introduction	Chapter 1
20	Types of Numerical data	Section 2.1
25	Statistical Tables	Section 2.2
27, Sep 1	Graphical Presentation	Section 2.3
3, 8	Descriptive Statistics	Section 3.1 – 3.2
10	Life Tables	Chapter 5
15	Introduction to Probability	Section 6.1-6.2
17	Discrete Probability Distributions Selection	Section 6.3-6.4
22	Diagnostic Tests and Bayes Theorem	Section 7.1-7.3
24	Normal Distribution	Section 7.4
29	Midterm I: 09:30 – 10:45am	
Oct 1	Introduction to Public Health Surveys	Section 22.1
6	Inference About the Sample Mean	Chapter 8 & Sections 9.1, 9.3
8	Hypothesis Testing: One-Sample T-test	Sections 10.1-10.4
13	Power and Sample Size Determination	Section 10.5-10.6
20	Paired Samples and Paired T-test	Section 11.1
22	Wilcoxon Signed-Rank Test	Section 13.2-13.4
27	Independent Samples and the Two-Sample T-test	Sections 11.2-11.3
29	Midterm II: 09:30 – 10:45am	
Nov 3	Wilcoxon Rank-Sum Test	Section 13.3
5	Comparing Proportions	Chapter 14
10	Contingency Tables and Chi-Square Test for Independence	Section 15.1.1
12	Odds and Odds Ratios	Section 6.5, 15.3
17	R by C Contingency Tables	Section 15.1.2

19, Dec 1	Introduction to Linear Regression	Section 17.1, 18.1-18.2
3	Regression Diagnostics	Section 18.2
10	Final Exam: 08:00 – 11:00am	

* N.B.: All dates are tentative

Topical Outline – Computer Lab

Students completing the computer laboratory exercises will be able to use the statistical software package Minitab to perform the statistical analyses described in lecture. Students should be able to interpret the output from Minitab procedures and draw appropriate conclusions from the results of the analyses.

Week 1: Introduction to Minitab Software

Week 2: Graphical presentation of data

Week 3: Exploratory data analysis

Week 4: Case Study: Low birth weight babies

Week 5: Screening tests and ROC curves

Week 6: Binomial and Poisson distributions

Week 7: Statistical Inference 1: Random sampling

Week 8: Statistical Inference 2: Properties of sample mean and variance

Week 9: Hypothesis Testing 1: One-sample t-test

Week 10: Hypothesis Testing 2: Paired t-test

Week 11: Wilcoxon signed-rank test

Week 12: Hypothesis Testing 3: Two-sample t-test

Week 13: Comparing two sample proportions

Week 14: Analysis of contingency tables

Week 15: Linear regression

To print computer output on the printer located just outside the lab, all students should bring their student IDs to class with sufficient Bulldog Bucks to print 5 pages of output. To save money, students are encouraged to save graphics as JPEG formatted files. Then multiple graphs can be imported into a Word file. Students are also encouraged to bring a flash card to each lab so that they can save their Minitab projects.

Grading Policy

Midterm 1	15%
Midterm 2	20%
Final Exam	30%
Computer Labs	15%
Homework and Quiz	20%

Make-Up Policy

You must contact the instructor in advance if you are unable to take an exam at its scheduled time. Arrangements may then be made for a make-up exam.

Attendance Policy

Attending all the classes is highly recommended. Although attendance will not be taken, randomly selected students will be asked questions during each lecture. Here absences and correct responses will be noted. Students with perfect records of correct responses will receive one bonus point on their final grade percentage. Students with more than two unexcused absence will lose one point from their final grade percentage.

University Honor Code and Academic Honesty Policy

All academic work must meet the standards contained in “A Culture of Honesty.” All students are responsible to inform themselves about those standards before performing any academic work.

Students with Disabilities

Students with disabilities who require reasonable accommodations in order to participate in course activities or meet course requirements should contact the instructor or designate during regular office hours or by appointment.

General Disclaimers

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.