

**SAN DIEGO STATE UNIVERSITY**  
**Graduate School of Public Health**  
**Division of Epidemiology and Biostatistics**

**PH 602 Biostatistics 3 Units**  
**Spring 2006**

<u>Sect</u>	<u>Day</u>	<u>Time</u>	<u>Location</u>	<u>Sched No.</u>
2	Tuesday	7:00p – 9:40p	Storm Hall 236	25281

**Instructor:** Karen Ferran, PhD

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**Office location:** Hardy Tower 13

**Office hours:** Tuesday 5:45pm-6:45pm or by appointment

**Blackboard:**

During the semester, course-related materials such as announcements, homework solutions, and sample exams will be posted on Blackboard. Please check regularly for new materials.

**Required Texts:**

– Rosner: *Fundamentals of Biostatistics, 6th Edition.*

– Alcaraz: “PH 602 Lecture Notes” (Lecture notes should be brought to *every* class meeting.)

**Calculator:**

Students will need a scientific calculator which, in addition to performing the basic arithmetic operations, should have at least the following functions: square root,  $y^x$ ,  $\ln$ , and  $e^x$ .

**Grading System:**

Class exercises	15%	93 – 100 = A	73 – 76 = C
Midterm exam	35%	90 – 92 = A–	70 – 72 = C–
Final comprehensive exam:	50%	87 – 89 = B+	67 – 69 = D+
		83 – 86 = B	63 – 66 = D
		80 – 82 = B–	60 – 62 = D–
		77 – 79 = C+	0 – 59 = F

**Academic Ethics:**

SDSU has a strict code of ethical conduct which students are expected to follow. See <http://www.sa.sdsu.edu/srr/judicial/StudentConductCode.html> for details. In particular, cheating on the exams will not be tolerated. You may not work together on the exams, may not copy answers from other students, and may not allow other students to copy your answers. Anyone caught cheating will face disciplinary action.

**Exercises:**

Exercises will include problems assigned from the text or from other sources. Although the solutions are posted on the Blackboard you are expected to complete the exercises assigned each week, check your work against the solutions and turn in your corrected problems for credit by the due date. The exam problems are similar to those in the exercises and, therefore, it is to your benefit to work the exercises. If time permits, some exercises may be discussed in class.

**Attendance/Punctuality:**

While attendance is not required except for exam dates, students are strongly encouraged to attend every class meeting and to be punctual. On exam dates, the exam will start at 7:00pm sharp and will end at a specific announced time. Those who arrive late on exam dates will not be allowed to work past the end time to complete their exams.

**Prerequisite:**

Passing the competency exam in basic statistical methods *or* successful completion of STAT 119 *or* STAT 250 *or* successful completion of an approved basic statistics course within the past three years. Students must complete the prerequisite prior to enrollment.

**Background:**

Students are expected to know descriptive statistics (Ch 2, Rosner); this material will not be covered in the course. Students should be familiar with basic concepts of probability (3.1 – 3.6, Rosner), the binomial distribution (4.8 – 4.9), the normal distribution (5.3 – 5.4), basic concepts of estimation (6.1 – 6.3), and basic concepts of hypothesis testing (7.1 – 7.2). These topics will be reviewed in the lectures; however, extensive discussions of this material will not be pursued.

**Learning Objectives:**

In this course, students will learn basic biostatistical methods used in biomedical and public health research. Students will be able to recognize and apply the appropriate biostatistical procedures to the analysis of health-related studies. Students will learn

1. To recognize the appropriate use of the binomial, normal, Student's  $t$ , chi-square and  $F$  distributions in estimation and hypothesis testing.
2. To describe the relationship between populations and samples, and the crucial role that random sampling plays in statistics.
3. To estimate such parameters as means, variances, and proportions, and to test hypotheses about these parameters (confidence intervals, one-sample test for proportion, one-sample  $t$ -test, two-sample  $t$ -test, paired  $t$ -test).
4. To apply nonparametric tests (Wilcoxon signed-rank test, Wilcoxon rank-sum test) when the underlying distributional assumptions are not met.
5. To assess the association—through relative risk or odds ratio estimation and through hypothesis testing (contingency tables)—between two variables when both variables represent groupings into categories or classes.
6. To understand the appropriate use of simple linear regression and correlation, and to estimate parameters and test hypotheses about linear relationships.
7. To complete a one-way analysis of variance model for comparing three or more means, and to describe procedures for performing multiple pairwise comparisons among these means.

## Course Outline for PH 602

Topic	Chapters in Rosner
Review of basic concepts of probability	3.1 – 3.6
Applications of Bayes' rule	3.7
Probability distributions	
Discrete	
Basic ideas	4.1 – 4.7
Review of the binomial distribution	4.8, 4.9
Continuous	
Basic ideas	5.1, 5.2
Review of the normal distribution	5.3, 5.4
Conversion from normal to standard normal	5.5
Normal approximation to binomial	5.7
Review of populations and samples	6.1, 6.2
Review of random sampling	6.3
Sampling distribution	6.5
Estimation: Point and interval	6.5, 6.7, 6.8
Hypothesis testing	
Review of basic concepts	7.1, 7.2
One-sample problem	7.3 – 7.7, 7.9, 7.10
Two-sample problem	8.1 – 8.7, 8.10
Nonparametric statistics	9.1, 9.3, 9.4
Hypothesis tests for categorical data	10.1 – 10.6, 13.3, 13.5
Simple linear regression	11.1 – 11.5
Correlation	11.7, 11.8
Analysis of variance	12.1 – 12.4