

# Elementary Statistics (Stat 108: #31036)

Summer 2011

Text: *Statistics* (3<sup>rd</sup> ed.), by Michael Sullivan (Prentice Hall) ♣ *required*  
Class notes: HSU Bookstore. This package has class materials that will be covered. ♣ *required*

Class: 08:00-10:50 MTWR BSS 204 (Lecture)  
11:00-13:50 MTWR Lab @ BSS 317

Professor: Dr. Yoon G. Kim, Department of Mathematics  
Office: BSS 348 ☎826-5399, (fax)826-3140, [ygk1@humboldt.edu](mailto:ygk1@humboldt.edu), <http://users.humboldt.edu/ygkim>  
Office hours: Please use lab hours by appointment

Objectives: This course is designed to help students understand probability and statistical concepts and modern statistical data analysis methods. You will be learning (i) basic concepts on statistical graphs, probability, distributions, and testing methods, (ii) application of modern statistical methods in a real world problem. In short, you *learn how to speak in terms of probability, how to analyze data, and what they mean*. You will be using the MINITAB statistical software package.

Grading:

Homework (Each HW set is worth the same)	25% of Final Grade
Two midterm tests (7/06/11, 7/18/11)	45% of Final Grade
Final (7/28/11 Thursday):	30% of Final Grade

Tests & etc.: Two mid-term tests and one final exam.

- Homework assignments, which are not turned in on time, will receive a grade of zero. Any tests taken at different time will be always *more difficult* than the regular test.
- (i) Use a *pencil* (not ballpen) to do your homework or exam.  
(ii) Use a clean 8½×11 (letter-size) paper. Do *not* tear off spiral notes.
- You are strongly encouraged to attend regularly. If you miss a class you are responsible for finding out what you missed. "*I wasn't there last time*" is never an acceptable excuse.

## Class Calendar:

	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>
Week 1	6/27/11	6/28/11	6/29/11	6/30/11
Week 2		7/05/11	7/06/11 <b>Test #1</b>	7/07/11
Week 3	7/11/11	7/12/11	7/13/11	7/14/11
Week 4	7/18/11 <b>Test #2</b>	7/19/11	7/20/11	7/21/11
Week 5	7/25/11	7/26/11	7/27/11	7/28/11 <b>Final</b>

\* This course fulfills [Lower Division General Education Area B: Mathematical Concepts & Quantitative Reasoning](#)

General education in the natural sciences and mathematics focuses on the physical universe and its life forms. This requirement helps students cope with, and participate in, the changing world. Recognizing the importance of scientific methods as investigative tools, the courses present science as a unified discipline with a major impact on the human condition. GE science courses:

- provide an understanding of the nature, scope, and limits of science and its relation to other branches of human inquiry;
- teach the language of science to facilitate cognition, interpretation, and communication;
- develop scientific reasoning for use in the critical examination of information;
- identify sources of information for the pursuit of scientific inquiry;
- impart the facts and principles which form our understanding of the living and nonliving systems of our universe;
- provide direct participation in a laboratory experience;
- develop mathematical concepts and quantitative reasoning and demonstrate their widespread applications in problem solving;
- promote an understanding of the impact of scientific knowledge and technology on our civilization both past and present and recognize the contributions made by men and women; and
- consider the moral and ethical implications of science so as to nurture a respect for human values.

Upon completing this requirement students will be able to:

- demonstrate their understanding of basic concepts in math and quantitative reasoning
- apply mathematical concepts and quantitative reasoning in scientific contexts

## ***Special Notes***

**Students with Disabilities:** Persons who wish to request disability-related accommodations should contact the Student Disability Resource Center in House 71, 826-4678 (voice) or 826-5392 (TDD). Some accommodations may take up to several weeks to arrange. See <http://www.humboldt.edu/disability/> for additional information.

**Add/Drop policy:** Students are responsible for knowing the University policy, procedures, and schedule for dropping or adding classes. See <http://www.humboldt.edu/~reg/regulations/schedadjust.html> for additional information.

**Emergency evacuation:** Please review the evacuation plan for the classroom (posted on the orange signs), and review [http://studentaffairs.humboldt.edu/emergencyops/campus\\_emergency\\_preparedness.php](http://studentaffairs.humboldt.edu/emergencyops/campus_emergency_preparedness.php) for information on campus emergency procedures. During an emergency, information can be found on campus conditions at <http://www.humboldt.edu/emergency> or by calling 826-INFO.

**Academic honesty:** Students are responsible for knowing policy regarding academic honesty. See [http://studentaffairs.humboldt.edu/judicial/academic\\_honesty.php](http://studentaffairs.humboldt.edu/judicial/academic_honesty.php) for information.

**Attendance and disruptive behavior:** Students are responsible for knowing policy regarding attendance and disruptive behavior. See [http://studentaffairs.humboldt.edu/judicial/attendance\\_behavior.php](http://studentaffairs.humboldt.edu/judicial/attendance_behavior.php) for information.

## **Syllabus**

### **Chapter 1. The Nature of Probability and Statistics**

- Introduction to Statistics
- Descriptive and Inferential Statistics
- Variables and Types of Data
- Observational and Experimental Studies

### **Chapter 2. Frequency Distributions and Graphs**

- Organizing Data by Their Types
- Histograms, Polygons and Ogives
- Pie Chart, Stem and Leaf Plot
- Quantiles, Outliers, and Boxplot

### **Chapter 3. Data Description**

- Measure of Central Tendency: Mean, Median, Mode, Weighted Mean
- Measure of Variation: Range, Variance, Standard Deviation
- Ungrouped Data and Grouped Data
- Chebyshev's Theorem and Empirical Rule

### **Chapter 4. Probability**

- Sample Space, Probability, Counting Rules
- Law of Large Numbers
- Addition Rule and Multiplication Rule
- Conditional Probability
- Bayes' Theorem

## Chapter 5. Discrete Probability Distributions

- Mean, Variance, and Expected Values
- The Binomial Distribution and its Properties

## Chapter 6. The Normal Distribution

- The Normal Distribution and its Properties
- Standard Score, Percentiles, and The Standard Normal Table
- The Central Limit Theorem
- The Normal Approximation to the Binomial Distribution
- The Normal Probability Plot

## Chapter 7. Confidence Intervals and Sample Size

- The  $t$  Distribution
- Confidence Intervals for the Mean (when  $\sigma$  is known vs. unknown)
- The  $\chi^2$  Distribution
- Confidence Intervals for the Variance
- Confidence Intervals for the Proportion

## Chapter 8. Hypothesis Testing

- Four Steps
- $H_0$  vs.  $H_1$
- P-value and the Decision Rule
- Hypothesis Testing for the Mean (when  $\sigma$  is known vs. unknown)
- 1-tailed test vs. 2-tailed test
- Hypothesis Testing for the Variance

## Chapter 9. Hypothesis Testing for the Two Sample Cases

- Hypothesis Testing for the Difference Between Two Sample Means (when  $\sigma$ 's are known vs. unknown)
- Hypothesis Testing for the Difference Between Two Sample Variances
- Hypothesis Testing for the Difference Between Two Sample Proportions

## Chapter 10. Correlation and Simple Linear Regression

- Scatter Plots, Basic Calculations, and Correlation
- The Least Squares Regression Line
- Coefficient of Determination and Standard Error of the Estimates
- Inferences for Estimates
- Multiple Linear Regression

## Chapter 11. Contingency Tables

- Test for Goodness of Fit
- Test for Independence

## Chapter 12. Analysis of Variance

- 1-Way Analysis of Variance
- Various Multiple Comparison Methods
- 2-Way Analysis of Variance