

**CALIFORNIA POLYTECHNIC STATE UNIVERSITY**  
**San Luis Obispo, California**

**STAT 130 - Introduction to Statistical Reasoning**

**March 2007**

**1. Catalog Description**

**STAT 130 Introduction to Statistical Reasoning (4 units)**

**GEB B.2**

Survey of statistical ideas and philosophy. Emphasis on concepts rather than in-depth coverage of statistical methods. Topics include sampling, experimentation, data exploration, chance phenomena, and methods of statistical inference. Credit not allowed for students with a previous statistics course. 4 lectures. Prerequisite: Satisfactory completion of ELM requirement.

**2. Required Background and/or Experience**

Satisfactory completion of ELM requirement.

**3. Expected Outcomes**

The student should be able to:

- a. Understand basic concepts of sampling and be familiar with several common sampling schemes.
- b. Understand basic concepts of experimentation, including the role of randomization, replication, and blocking.
- c. Summarize data sets using graphical and numerical methods.
- d. Compute and interpret measures of central tendency and variability.
- e. Be able to use a statistical computer program to get graphical and numerical summaries of a data set.
- f. Compute and interpret simple measures of association and correlation.
- g. Understand the basic concepts of probability, and be able to identify fallacious arguments involving probability.
- h. Understand the rationale behind interval estimation and tests of hypotheses.
- i. Conduct large sample hypothesis tests and be able to interpret observed significance levels.

**4. Text and References**

Possible Texts: *Seeing through Statistics: 3rd Edition, Utts, Jessica. 2004 Duxbury.*

*Statistics: Concepts and Controversies, 6th Edition, Moore, David and  
Notz, William. 2005 Freeman*

**5. Minimum Student Materials Required**

Text, paper, pencils and pocket calculator.

**6. Minimum Facilities Required**

Classrooms with chalkboards, audiovisual equipment, and computer access.

7. Expanded Description of Content and Method of Instruction

CONTENT	HOURS OF LECTURES
A. The discipline of statistics, examples, and collection of data .....	<b>8</b>
1. Benefits and risks of using statistics .....	1
2. Reading the news .....	1
3. Measurements .....	1
4. Sampling .....	2
5. Experiments and observational studies .....	3
B. Describing data.....	<b>13</b>
1. Summarizing and displaying measurements.....	1½
2. Introduction to statistical computer programs .....	2
3. Bell-shaped curves .....	1½
4. Plots and graphs .....	1
5. Relationships between measurement variables.....	3
6. Relationships between categorical variables.....	2
7. Describing time series variables .....	2
C. Probability .....	<b>4</b>
1. Introduction to probability, probability rules, and expectation.....	2
2. Psychological influences on personal probability.....	1
3. Probability and intuition; agreements and disagreements.....	1
D. Statistical inference .....	<b>11</b>
1. Sampling variability.....	2
2. Confidence intervals .....	3
3. Hypothesis testing and significance.....	6
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	<b>TOTAL</b> 36

**METHOD OF INSTRUCTION**

- a. Lecture/discussion and activity
- b. Readings in the text and other assigned material
- c. Appropriate homework assignments

8. Methods of Evaluation Outcomes

Homework, projects, and in-class examinations.