

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

**STAT 130 - Introduction to Statistical Reasoning**

**Fall 2015**

**1. Catalog Description**

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

**GE B1**

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. Not open to students with credit in any statistics course. 4 lectures. Prerequisite: Passing score on the ELM examination, or an ELM exemption, or credit in MATH 104.

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

Passing score on the ELM examination, or an ELM exemption, or credit in MATH 104.

**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. Compute and interpret simple measures of association and correlation.
- f. Understand the basic concepts of probability, and be able to identify some fallacious arguments involving probability.
- g. Understand the rationale behind interval estimation and tests of hypotheses.
- h. Conduct large sample hypothesis tests and be able to interpret observed significance levels.

**4. Text and References**

Possible Texts: *Seeing through Statistics: 4th Edition, Utts, Jessica. 2015 Cengage Learning.*

*Statistics: Concepts and Controversies, 8th Edition, Moore, David and Notz, William. 2013  
W.H. Freeman.*

**5. Minimum Student Materials Required**

Text, paper, pencils and pocket calculator.

**6. Minimum University 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>10</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
6. Data ethics.....	2
B. Describing data.....	<b>11</b>
1. Summarizing and displaying measurements.....	1½
2. Bell-shaped curves .....	1½
3. Plots and graphs .....	1
4. Relationships between measurement variables.....	3
5. Relationships between categorical variables.....	2
6. 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
	<b>TOTAL</b>
	<b>36</b>

**METHOD OF INSTRUCTION**

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

8. **Method of Evaluating Outcome**

Homework, projects, and in-class examinations.