

STAT 217 - Introduction to Statistical Concepts and Methods

Fall 2015

1. Catalog Description

STAT 217 Introduction to Statistical Concepts and Methods (4) GE B1

Sampling and experimentation, descriptive statistics, confidence intervals two-sample hypothesis tests for means and proportions, Chi-square tests, linear and multiple regression, analysis of variance. Substantial use of statistical software. Not open to students with credit in STAT 218 or STAT 221 or STAT 251. 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. Design a data collection scheme based on simple random sampling or simple experimental designs;
- b. Summarize data using graphical and numerical techniques;
- c. Construct and interpret confidence intervals for one sample and two sample differences between means and between proportions;
- d. Conduct one-sample and two-sample tests of significance for means and proportions;
- e. Calculate and interpret measures of association and perform Chi-square test for independence;
- f. Use simple linear and multiple regressions to describe relationships between variables; and
- g. Perform analysis of variance tests for completely randomized designs.

4. Suggested Texts

Devore, J. and Peck, R., *Statistics: The Exploration and Analysis of Data*, 7th ed., Cengage, 2012.

Diez, D., Barr, C., and Cetinkaya-Rundel, M., *OpenIntro Statistics*, 3rd ed., 2015.

Moore, D., Notz, W. I., and Fligner, M., *The Basic Practice of Statistics*, 7th ed., Freeman, 2015.

Sanders, D., and Smidt, R., *Statistics: A First Course*, 6th ed., McGraw-Hill, 2000.

Tintle, N. et al. *Introduction to Statistical Inference*, 1st ed., Wiley, 2016

5. Minimum Student Materials

Calculator for student use in preparing assignments and taking exams. Access to statistical software.

6. Minimum University Facilities

Chalkboard for instructional use, overhead projector.

7. **Expanded Description of Content and Method**

<u>CONTENT</u>	<u>NUMBER OF LECTURES</u>
A. COLLECTING DATA	4
1. Sampling (simple random, stratified)	
2. Experimentation (CRD, matched pairs)	
3. Causation versus association	
B. TYPES OF VARIABLES	1
1. Categorical, numerical	
C. DESCRIPTIVE STATISTICS	
1. Graphical Summaries	3
a. Univariate	
b. Bivariate	
2. Numerical Summaries	4
a. Measures of central tendency	
b. Measures of variability	
c. Measures of relative position	
d. Empirical Rule	
D. INTRODUCTION to statistical software	1
E. ESTIMATION	5
1. Logic and interpretation of confidence intervals	
2. One sample intervals for population mean and proportion	
3. Two sample intervals for the difference between means	
4. Two sample intervals for the difference between proportions	
F. TESTS OF SIGNIFICANCE	8
1. Logic and interpretation of tests of significance	
2. One sample tests about population means and proportions	
3. Two-sample tests for means and proportions	
G. EXPLORING ASSOCIATION	3
1. Chi-Square Test for Independence	
2. Pearson's correlation coefficient	
H. SIMPLE AND MULTIPLE LINEAR REGRESSION MODELS	5
1. Fitting a model using least squares	
2. Interpretation of computer output	
3. Model evaluation	
J. ANALYSIS of VARIANCE	2
1. One-way AOV for a Completely Randomized Design	
	TOTAL 36

METHOD

Development of fundamental concepts and methods. Statistical analysis of actual problems.

8. **Method of Evaluating Outcome**

By one or more of assignment of exercises, projects, and examinations.