



STA 270 APPLIED STATISTICS MASTER SYLLABUS

CATALOG DESCRIPTION

STA 270 Applied Statistics (3). Graphical and quantitative description of data; binomial, normal, and t distributions; one- and two-sample hypothesis tests and confidence intervals; simple linear regression and correlation. Credit cannot be earned in both STA 270 and STA 275. Letter grade only. Course fee required. *Prerequisite:* NOT for Mathematics majors. (MAT 100 with a grade of P taken Fall 2013 or later) or (MAT 102X or MAT 108 or MAT 114 or higher w/ grade of C or better) or satisfactory placement.

COURSE INFORMATION

This course fulfills a requirement in the Science / Applied Science distribution block in the University Liberal Studies program. It supports the mission of the program to prepare students to live responsible, productive, and creative lives as citizens of a dramatically changing world through the study of statistical methodology and its application. Essential skills in this course are critical thinking, quantitative reasoning, and scientific reasoning.

LEARNING OUTCOMES

Upon successful completion of the course, the student will be able to:

1. Explain simple statistical methods commonly used in reporting polling data and scientific research studies using correct statistical notation and appropriate language.
2. Construct informative graphical and numerical summaries of data appropriate for the type of data and the context in which the data were collected.
3. Interpret the meaning of graphical and numerical summaries of data in written terms appropriate to the context in which the data were collected.
4. Recognize and properly carry out parameter estimation (including confidence interval calculations) and hypothesis testing procedures by hand, with the aid of a statistical calculator, or using a statistical software program.
5. Explain the formalism of parameter estimation and hypothesis testing and how it relates to, supports, and advances the scientific method.
6. Properly apply the formalism of parameter estimation and hypothesis testing to scientific inquiry by appropriate statistical analysis of collected data.
7. Identify the limitations of the statistical methodology learned in the course, and be able to recognize problems in which the statistical methods learned are not appropriate.

COURSE CONTENT

1. Descriptive Statistics – *approximately 8 days*
What is statistics; population vs. sample; data collection; frequency distributions; graphical techniques for summarizing single variable and bivariate data; numerical measures of average, variation, and correlation; linear regression as a descriptive tool.
2. Probability – *approximately 5 days*
What is probability; binomial and normal distributions; sampling distributions; the central limit theorem.
3. Inferential Statistics – One Population – *approximately 14 days*
What is statistical inference; the t distribution; point estimation and confidence intervals for a population mean; point estimation and confidence intervals for a population proportion. Hypothesis tests concerning a population mean; and hypothesis tests concerning a population proportion.

4. Inferential Statistics – Two Populations – *approximately 7 days*
Confidence intervals and hypothesis tests concerning two population means; independent samples; paired samples. Confidence intervals and hypothesis tests concerning two population proportions.
5. Computer laboratory activities – *approximately 2 days*

If time permits other topics include: (a) linear regression including inference about the fitted line, or (b) the chi-square distribution, goodness of fit tests, and contingency tables.

STRUCTURE AND APPROACH

The course will provide the student with opportunities to learn about the methodology of statistics through lectures, discussions, individual and group projects, and computer laboratory activities according to instructor design. Readings in the textbook will provide basic information to assist student learning.

COMPUTER LAB

One or more class sessions will be held in a computer lab where students will learn how to use a statistical software package (*e.g.*, JMP). The use of statistical software will be required to complete technology assignments and may also be used in completing other homework as indicated by the instructor.

ASSESSMENT

The assessment procedures include a minimum of three in-class exams and a comprehensive final examination worth at least 25% of the overall grade. In addition, individual sections will use two or more of the following items: (a) collected traditional homework assignments; (b) collected homework requiring the use of statistical software; (c) quizzes; and (d) group or individual projects requiring the collection of data, data analysis (using statistical software) and a written report.

CURRENT AND RECENT TEXTS:

Statistics: The Exploration and Analysis of Data, 7th edition, Peck & Devore, Duxbury/Cengage (e-book or hard copy).