

Math 227 Statistics
Room: MSA 003
Instructor: William Bucher

4 Units
Section: 1497
Office: MSB 207

MTWTh 9:35-10:40
Fall 2014
e-mail: bucherw@wlac.edu

Office Hrs: 7:00-8:00 MTWTh in D 106; 2:10-4:00 PM MTWTh in MSB 207; or by appointment

Office Phone: (310) 287-4211 Note: It is better to e-mail so there is a written record.

Course Description:

This course is an introduction to probability, measures of central tendency and dispersion, descriptive and inferential statistics including sampling, estimation, hypothesis testing, analysis of variance, chi-square and student's t tests, linear correlation and regression analysis.

General SLO—Student Learning Objective

A.) Critical Thinking: Analyze problems by differentiating fact from opinions, using evidence, and using sound reasoning to specify multiple solutions and their consequences.

C.) Quantitative Reasoning: Identify, analyze, and solve problems that are quantitative in nature.

F.) Technical Competence: Utilize the appropriate technology effectively for informational, academic, personal, and professional needs.

Specific Learning Objectives:

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

- 1.) Define and explain the core terminology involved in experimental design, e.g., simple random sample, census, control group, etc.
- 2.) Display data in frequency distributions, histograms and stem-and-leaf diagrams.
- 3.) Distinguish between the various measures of central tendency and explain how and why these measures are computed. (Mean, median, mode)
- 4.) Distinguish between the various measure of variation and explain how and why these measures are computed. (Range, variance, standard deviation)
- 5.) Explain percentiles.
- 6.) Define and explain the core terminology involved in basic probability theory, e.g., experiment, simple event, compound event, sample space, etc.
- 7.) Use the rules of basic probability to compute the probability of a wide variety of events in a wide variety of classical probability experiments.
- 8.) Use permutations and combinations to count—particularly outcomes in sample spaces.
- 9.) Explain what a random variable is and how it is connected to a probability distribution.

- 10.) Compute the mean and standard deviation of a discrete random variable.
- 11.) Recognize binomial experiments and use formula or tables to compute the probability of various events.
- 12.) Demonstrate an understanding of normal probability distributions and how they relate to the Standard Normal Distribution.
- 13.) Use tables and z-scores to compute normal probabilities.
- 14.) Use the Normal Approximation to the Binomial Distribution.
- 15.) Demonstrate an understanding of the concept of a sampling distribution. Explain the relationship between population and sample and parameter and statistic.
- 16.) Demonstrate an understanding of the Central Limit Theorems.
- 17.) Demonstrate an understanding of sampling distributions for proportions.
- 18.) Construct confidence intervals:
 - a.) Estimate μ when σ is known.
 - b.) Estimate μ when σ is unknown.
 - c.) Estimate p .
 - d.) Estimate the difference of means and/or differences of proportions.
- 19.) Set up hypothesis tests involving means, proportions, or differences of these:
 - a.) State the null and alternate hypotheses
 - b.) Sketch the distribution being used and mark the off critical regions.
 - c.) Compute test statistic.
 - d.) State decision.
 - e.) Answer any questions posed about the decision.
- 20.) Use and explain significance levels and p-values in hypothesis testing.
- 21.) Graph bivariate data in scatter plots.
- 22.) Demonstrate an understanding of the linear correlation coefficient—the meaning of r .
- 23.) Demonstrate an understanding of the coefficient of determination, r^2 .
- 24.) Determine the equation for the regression or least squares line.
- 25.) Set up and make inferences involving correlation and regression.
- 26.) Use the chi-square distribution to perform tests of independence, homogeneity, and goodness of fit.
- 27.) Use the chi-square distribution to perform estimation and hypothesis testing involving variance and standard deviation.
- 28.) Use the F-Distribution for testing two variances.
- 29.) Demonstrate a familiarity with ANOVA.
- 30.) Use appropriate technology in all the tasks listed above.

Textbook: Statistics, 3th ed., Sullivan, Pearson, 2006.

The third edition can be obtained cheapest from the internet, rent or buy. The book is now in a fourth edition which makes the third edition reasonable.

Schedule: See next page.

Homework: Homework assignments will be assigned every class meeting. We shall discuss previously assigned problems at the beginning of each class period. I do not collect the homework—you are adults—but failure to do the homework in a timely and consistent fashion will result in failing grades on the examinations. I strongly advise you to keep completed/revised homework in an organized binder for review before examinations.

**Tests
& Grades:**

1.) There will be three examinations during the course of the semester. These examinations will be full period affairs. See Schedule for approximate dates. There will be positively no makeup exams. If you are foolish enough to miss an exam, your final examination score will simply be substituted in the computation of your test average. Each of the three examinations will be worth 23% of your overall final course grade, making for a total of 69% for all three exams. See schedule for tentative exam dates.

2.) The final examination will be comprehensive and will occur during the week set aside for finals by the college. This final exam will be worth the remaining 31% of your final course grade.

Summary:	Tests(three at 23% each)	69%
	Final Examination	<u>31%</u>
	Total	100% of your course grade.

3.) Grading Scale: I use a straight scale:	100-90%	A
	89-80%	B
	79-68%	C
	67-55%	D
	54-00%	F

Important Note About Calculators: If you do not already own one, you will need to purchase a scientific calculator with statistical capabilities—preferably one that can do regression (two variable calculations) automatically. You do not need to go over the top price wise. If you are uncertain about what kind to purchase, talk to me. **You may not use your cell phone as a calculator during exams!!! Get a calculator!!! The best calculator is a TI 83 Plus or TI 84 or higher.**

Cell Phones

Cell phone use is strictly forbidden in the classroom. If you possess a cell phone, it must be set on silent vibrate mode while you are in the classroom. If you absolutely must take an emergency call, please exit the classroom quietly and do so outside.

Note About Attendance: If you miss more than 4 meetings (a week) of the course, the instructor has the option of excluding you from the course. If you are doing failing work, I will utilize this option at the earliest possible date. Once you have been excluded, there will be no reinstatement.

Tentative Schedule for Math 227
Sullivan

Month	Mon.	Tues.	Wed.	Thu.	Sections Covered
Sept.	H	2	3	4	1.1-1.3, 1.5, 2.1-2.4
	8	9	10	11	3.1-3.4, 5.1-5.2
	15	16	17	18	5.3-5.6
	22	23	24	25	6.1-6.3
Oct.	29	30	1	2	7.1, 7.2 Test: 1
	6	7	8	9	7.3-7.5
	13	14	15	16	8.1-8.2, 9.1-9.2
	20	21	22	23	9.3-9.5, 10.1-10.2
Nov.	27	28	29	30	10.3-10.4 Test: 2
	3	4	5	6	10.5-10.6, 11.1-11.2
	10	H	12	13	11.3-11.5
	17	18	19	20	4.1-4.4, 14.4
Dec.	24	25	26	H	12.1-12.2
	1	2	3	4	13.1-13.2 Test: 3
	8	9	10	11	Review for Final
		15-21			Finals

Final Examination: Dec. 17, 10:15-12:15 am
 Last date to drop without a fee—Friday, Sept. 12
 Last day to drop without a W—Friday, Sept. 12
 Last day to drop with a W—Nov. 21, 2014

