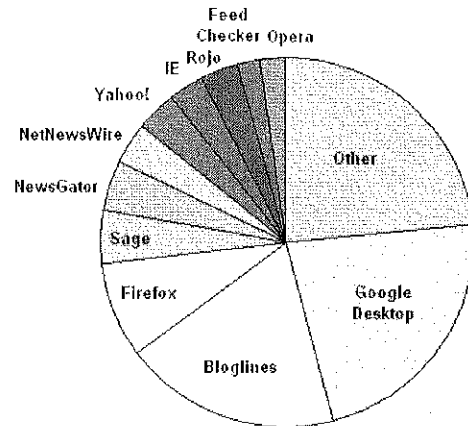
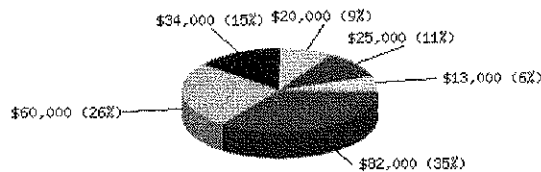


Math 107
Fall/2008

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Some thoughts.....

Statistics are the triumph of the quantitative method, and the quantitative method is the victory of sterility and death. Hillaire Belloc

The traditional mathematics professor of the popular legend is absentminded. He usually appears in public with a lost umbrella in each hand. He prefers to face the blackboard and to turn his back to the class. He writes a, he says b, he means c; but it should be d.
George Polyá

There are three kinds of lies: lies, damned lies, and statistics. Benjamin Disraeli

The mathematical sciences particularly exhibit order, symmetry, and limitation; and these are the greatest forms of the beautiful. Aristotle

Statistics: the mathematical theory of ignorance. Morris Kline

Numbers are intellectual witnesses that belong only to mankind. Honore de Balzac

If your experiment needs statistics, you ought to have done a better experiment.
Ernest Rutherford

To call in the statistician after the experiment is done may be no more than asking him to perform a postmortem examination: he may be able to say what the experiment died of.
Ronald Aylmer Fisher

Text and materials: Elementary Statistics, 6th ed., Allan G. Bluman
 Math 107 Notebook
 Calculator (TI-83 or 83 PLUS, TI-84 or 84 PLUS recommended)

Course Content: Visual displays of data, measures of central tendency and variability, classification of data, counting, probability, Chebyshev's Theorem, normal distribution, binomial distribution, Central Limit Theorem, hypergeometric distribution, Poisson distribution, Confidence Intervals, Hypothesis testing (means, proportions, variances), Simple linear regression and correlation, Analysis of Variance (one way), Chi-Square Tests (Goodness-of-fit, Contingency Tables), Nonparametric methods (Wilcoxon [for independent and dependent samples], Kruskal-Wallis, Spearman's). Emphasis is on inference.

Goals:

1. Cognitive: At the end of this course students should be able to:
 - (1) Categorize a data set.
 - (2) Correctly work various simple probability problems.
 - (3) Articulate the role of functions in statistics.
 - (4) Describe major misuses of statistics.
 - (5) Recognize several distributions and characterize them.
 - (6) Analyze interval data for which statistical tests involving means, proportions, medians, rankings, and variances are the parameters.
 - (7) Interpret relationships in bivariate data.
 - (8) Discuss the difference between parametric and nonparametric statistics in relation to inherent assumptions of the general statistical model.
 - (9) Recognize and explain the limitations of statistics.
 - (10) Interpret the role of statistics in analyzing data and in inference.
 - (11) Use a computer and/or a calculator for appropriate statistical tests.
 - (12) Interpret statistical findings in relation to the situation from which the data was drawn.
 - (13) Describe the experimental nature of mathematical statistics.
 - (14) Draw inferences using the vocabulary of statistics.
2. Affective:
 - (1) Students may choose to use suggested organizational guidelines, study skills and test-taking approaches.
 - (2) Students will perform experiments, using appropriate statistical techniques.
 - (3) Group work for the experiments will enable students to coordinate with others while completing a project and will enable students to develop problem-solving strategies.

The general goals for students taking this course are: (a) begin to be good consumers of information through gaining knowledge about statistics, (b) become more focused on

learning processes as they learn and apply study skills, and (c) stay active in the learning process thus integrating cognitive and affective goals.

Grading: Student grades are determined by their performance on five tests, experiments, and the final exam.

5 Tests	500	A:	900 points and above
Experiments	300	B:	800-899 points
Final Exam	200	C:	700-799 points
TOTAL	1000	D:	600-699 points
		F:	below 600 points

Tests: Tests will be given at 2:00 p.m. on **September 19, October 10, October 31, November 14, and December 5**. Each test will cover the topics listed for that test on the attached outline. Formulas will be provided. Each student will need a calculator.

Students are expected to take all tests at the scheduled times. Any emergencies will be handled on an individual basis and must be documented. Any student needing special accommodations must communicate these needs and make arrangements at least two class periods in advance of any test. The final exam will be given at the time scheduled by the registrar and will include material selected from the entire course.

Experiments: There will be experiments, with students working in groups of two or three. Example experiments are provided in the notebook for this course. Each student is expected to participate in a somewhat "equal" manner. A signed form of individual contributions must accompany each experiment (See the Notebook). No experiment will be accepted after class time on the due date. An individual's grade is based on the individual's contribution, the group's write-up, the statistical analysis used, the experimental procedure outlined and followed, and creativity including originality and neatness.

Homework: Homework problems will not be collected but are to benefit the student. To do well, the average student will need to study about 3 hours outside of class for every class meeting or around 8 to 9 hours per week.

Office Hours: Office hours will be announced by the instructor.

Outside Help: In addition to office hours, students are encouraged to use the following:

There is a class conference, Math 107 Fall 2008. Students should have the class conference on their desktops and should consult this conference frequently for announcements about office hours, SI sessions, tutoring, etc. Students may pose individual questions on the class conference.

There will be SI leaders for Math 107. Our SI student leaders will schedule review sessions each week. These sessions are optional, however each student is encouraged to pick one of the times per week and attend regularly. Even though these sessions are optional, students who attend SI sessions generally do better in the courses for which there are SI leaders. Student tutors are available in the Math Tutoring Center (schedule to be posted as soon as it is finalized).

Study groups organized by students are highly recommended.

Finally, there are valuable resources on <http://mathcenter.oxford.emory.edu> which include notes and video tutorials.

Attendance Policy: You are expected to attend all classes since you are responsible for work covered in class. Emergencies and verifications are at the discretion of the professor.

HONOR CODE: THE HONOR CODE APPLIES TO ALL WORK SUBMITTED FOR CREDIT POINTS TOWARD YOUR GRADE. ALL SUCH WORK WILL BE PLEDGED TO BE YOURS AND YOURS ALONE. YOU PLEDGE THAT WITH YOUR SIGNATURE.

Topics and homework assignments

PART 1 for Test 1:

8/27 (Wed.)

Introduction to Statistics

Chapter 1: Make study notes on the types of data (pp 6-9); on the types of sampling (pp 10-12), on an experimental design; begin a list of "misuses" of statistics; record stories from history (class notes); summary on pp 24-25; p. 26: 7, 8, 9, 11, 12, 13, 17, 19, 21-29

8/29 (Fri.), 9/3 (Wed.)

Introduction to Statistics, Jerome Cardan

Chapter 2: Make study notes on categorical frequency distributions (class tally, frequency, percent), group frequency distributions (class limits, class boundaries [use of ".5"], tally frequency, cumulative frequency), grouped frequency distribution rules (pp 38-39). Be able to create a frequency histogram and a relative frequency histogram. Be able to create a display using stem and leaf; p. 44: 11, 17 (draw a frequency histogram); p. 58: 7; p. 79: 15, 17; p. 88: 21; p. 91: 26

9/5 (Fri.), 9/8 (Mon.)

Descriptive Statistics

Chapter 3: see p. 107-108 distributions p. 109, p. 123, p. 125, p. 127; p. 110: 1, 9, 11, 31; p. 129: 5, 15, 33, 35, 43, 46; p. 157: 7, 9, 10, 11, 15, 18; p. 164: 14
Find the smallest integer value, x , such that x is an outlier of the following data set: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, x . Use both definitions and compare.

9/10 (Wed.), 9/12 (Fri.)

Laws of Probability and Counting

Chapter 4, p. 219 rules; p. 185: 9, 12, 13, 14, 15, 17, 21, 23, 25; p. 193: 3, 5, 7, 9, 11, 13, 17, 19, 23, 24, 25; p. 209: 3, 7, 12, 15, 23, 25, 29, 31, 33, 35, 39, 41, 43, 47; p. 220: 1 – 51 odd; p. 226: 1, 3, 5, 7, 9, 11; summary p. 227-228; p. 229: 3, 5, 7, 9, 11, 13, 15, 19, 21, 23, 25, 27, 31, 35, 37, 39, 41; p. 231: 18 – 47 odd

9/15 (Mon.), 9/17 (Wed.)

Bayes' Theorem, birthday problem

Appendix B-2, p. A-9; A-12: 1, 3, 5, 7, 9, 11; p. 233: 3

9/17 (Wed.)

Review for Test 1

Notebook notes and problems, p. 2-10.

9/19 (Fri.)

**Review, cont.
Test 1****PART 2 for Test 2:**

9/22 (Mon.)

Probability Distributions

Chapter 5, Sections 5-2, 5-3, 5.4: p. 244: 1, 7, 9, 11, 12-18, 19, 23, 25 (make a probability graph and a probability histogram); p. 253: 1, 5, 7, 11, 15, 17, 20; p. 263: 1, 3, 5, 9, 11, 13, 15, 19, 21, 23, 25

9/24 (Wed.) and 9/26 (Fri.) **More Probability Distributions (Binomial, Poisson, Hypergeometric)**

Chapter 5, Section 5-5: p. 276: 1, 3, 5, 9, 11, 13, 15, 17, 19; p. 279: 1, 3, 7, 9, 13, 17, 19, 21, 23, 25, 27, 29, 31; p. 281: 11, 13, 16, 17, 18, 19, 21, 22, 24, 25, 27, 29, 31

9/29 (Mon.), 10/1 (Wed.) **Normal Distribution**

Chapter 6, Sections 6-2, 6-3, 6-4: Normal Distribution p. 289; p. 302: 1-49 odd; p. 316: 3, 5, 9, 13, 15, 17, 19, 21, 23, 27, 33, 35, 38, 41

10/3 (Fri.), 10/6 (Mon.)

Central Limit Theorem, Normal Approximation to the Binomial

Chapter 6, Sections 6-5, 6-6: Central Limit Theorem p. 324; p. 329: 9, 11, 13, 15, 17, 19, 21; p. 337: 1, 3, 5; p. 339: 3, 5, 7, 9, 13, 15, 16; p. 341: 1-34 (for more problems, if you need them)

10/8 (Wed.)

Review for test 2

Notebook notes and problems, p.11-16.

10/10 (Fri.)

**Review, cont.
Test 2**

PART 3 for Test 3:

10/15 (Wed.), 10/17 (Fri.) **Confidence Intervals**

Chapter 7: p. 358: 1, 3, 5, 9, 11, 13, 17, 21, 23, 25; know the characteristics of the student t distribution; p. 366: 1, 3, 5, 7, 11, 13, 15, 19; p. 374: 3, 5, 7, 9, 11, 13, 15, 17, 19; p. 385: 1, 3, 5, 7, 9, 11; p. 387: 12-23

10/20 (Mon.), 10/22 (Wed.) **Hypothesis Testing**

Chapter 8, Sections 8-1, 8-2, 8-3: know the five step hypothesis testing procedure, the two types of errors (p. 397); Read section 8.2 slowly and carefully! Make notes. p. 404: 1-13; p. 414: 1, 3, 5, 7, 9, 13, 14, 15, 17, 19, 25

10/24 (Fri.), 10/27 (Mon.) **Hypothesis Testing**

Chapter 8, Sections 8-4, 8-5, 8-7, 8-8, Read pg 451-452; p. 426: 1, 2, 3, 5, 7, 9, 11, 13, 15, 19; p. 434: 1-4, 5, 7, 11, 13, 15, 17, 19; p. 453: 1, 3, 5, 7; p. 455: 1, 3, 5, 7, 9, 19; Not Section 8-6; p. 458: 15, 17, 21, 23, 25, 33

10/29 (Wed.) **Review for Test 3**

Notebook notes and problems, p.17-24. Also history p. 62-66.

10/31 (Fri.)

**Review, cont.
Test 3**

PART 4 for Test 4:

11/3 – 11/7 MWF **Inferences from Two Samples**

Chapter 9: F-distribution p. 477; p. 471: 5, 7, 9, 11, 13, 15, 17, 19, 21; p. 483: 7, 9, 13, 19; p. 492: 1, 3, 7, 9, 13; p. 506: 3, 5, 7, 9; p. 514: 1, 3, 5, 9, 11, 13, 17; p. 519: 1, 9, 13; p. 521: 14, 15, 16, 22, 26, 27, 29.

11/7 (Fri.), 11/9 (Mon.) **Correlation and Regression**

Chapter 10, 10-2, 10-3, 10-4 and parts of 10-5, p. 575 summary; p. 542: 13, 17, 19, 25; p. 551: 13, 17, 19, 25; p. 577: 1, 3, 5, 7; answer problems/questions, p. 578: 1-21.

11/12 (Wed.) **Review for Test 4**

Notebook notes and problems, p. 17-24, p. 25-31, history p. 67-70.

11/14 (Fri.)

**Review. cont.
Test 4**

PART 5 for Test 5:

11/17 (Mon.)

Chi Square Models

Chapter 11: Characteristics of the Chi Square function pp 378-379; p. 593: 5, 7, 9, 11, 13, 15; p. 605: 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31; p. 613: 1, 3, 5, 7, 9; p. 615: 11, 13, 15, 17, 19.

11/19 (Wed.), 11/21 (Fri.)

ANOVA

Chapter 12, Sections 12-2, 12-3: p. 634: p. 1-7, 9, 17, 19; p. 652: 1, 5; p. 654: 15, 16.

11/24 (Mon.)

Wilcoxon Rank Sum and Kruskal-Wallis tests

Chapter 13, Sections 13-2, 13-4, 13-6: p. 674: 5, 7, 9; p. 685: 1, 11; p. 700: 3, 5, 8; p. 702: 17, 19, 20, 21.

12/1 (Mon.)

Spearman's correlation

Chapter 13, Section 13-7: Table L on p 779 gives the critical values; procedure summarized on page 690; p. 695: 5, 7, 9; p. 700: 10, 11.

12/3 (Wed.)

Review for Test 5

Notebook notes and problems, p. 32-46.

12/5 (Fri.)

Review, cont.
Test 5

12/8 (Mon.)

Review for Final

