Mathematics 107 - Introduction to Probability and Statistics
Spring, 2001 - Dr. Fang Chen

Text: <u>Elementary Statistics</u>, 8th ed. Mario F. Triola with computer disc and formula sheet.

Materials: Calculator(TI-83) and Math 107 Notebook

<u>Course Content</u>: Visual displays of data, measures of central tendency and of 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), Contingency Tables, nonparametric tests (Wilcoxon Rank-Sum and Kruskal-Wallis Tests). Emphasis is on inference.

<u>Goals</u>: At the end of this course students should be able to: categorize a data set; work various simple probability problems; understand the role of functions in statistics; describe major misuses of statistics, recognize several distributions and characterize them; analyze interval data for which statistical tests involving means, proportions, medians, rankings, and variances are the parameters; interpret relationships in bivariate data; know the difference between parametric and nonparametric statistics in relation to inherent assumptions of the general statistical model; recognize the limitations of statistics; understand the role of statistics in analyzing data and in inference; use a computer and/or a calculator to find measures of central tendency, measures of variability, basic test statistics; interpret statistical findings in relation to the situation from which the data was drawn, describe the experimental nature of mathematical statistics, draw inferences using the vocabulary of statistics. The goal is for students to begin to be good consumers of information.

<u>Grading</u>: Grades will be determined by student performance on four (best) tests; three experiments and a comprehensive final exam:

5 tests @ 100	400 (drop lowest)	In general,	
2 experiments @ 50	100	A, A-:	720 points and above
1 final	<u>300</u>	B+, B, B-:	640 - 719 points
	800	C+, C, C-:	560 - 639 points
		D+, D:	480 - 559 points
		F:	below 480 points

Each <u>test</u> will have 100 points and will be given on the following Fridays in Seney Hall: at 2:15 on February 2, February 23, March 23, April 13, and April 27. Tests should take around 75 minutes. The best four grades will be used. **There is no provision for making up tests.** Emergencies will be handled on an individual basis.

Each _experiment_ has a potential of 50 points. Example experiments are provided in the notebook for this course. All experiments are the results of group work. Each student is expected to participate in a somewhat "equal" manner. A form for each student to give individual contributions and to sign **must** accompany each experiment. **No experiment will be accepted after the due date and time.**

Your _final exam_ will include material selected from the _entire course_. The final exam will be given at the time designated on the final exam schedule.

You may use formula sheets that are provided and your calculator for appropriate portions of tests, experiments, and the final exam.

Homework: Class time will be used to enrich topics in statistics but will not be used to summarize information from the text. It is your responsibility to read the textbook. Homework problems will not be collected but are to benefit you. Basic problems and listings of the information for which you are responsible are included in the notebook for this course. You will need to stay current with the assignments.

To do well in this course, the average student will need to study about 3-4 hours outside of class for every class meeting or around 6-8 hours per week. Preparing experiments and studying for tests will take additional time.

Attendance: You are expected to attend all classes since you are responsible for work covered in class. An inordinate amount of absences will be handled in accordance with school policies.

You are expected to take tests at the scheduled times. Any conflicts, problems, or emergencies will be handled on an individual basis. Since one test grade is dropped, there are **no provisions for making up tests.** You must be present in order to take tests. Experiments involve group work that **can not be made up**. You must be present on the day the experiment is assigned to be in a group and have a grade for the assigned experiment.

Tutors: Student tutors are scheduled for a limited amount of time per week, in the evenings, in the Gregory Study room. If you have difficulty with homework problems, you may want to discuss these problems with tutors. A listing of tutors for mathematics courses, with times and places, may be found posted outside the mathematics offices after the first week of classes.

Other Resources: (1) The library has on reserve a set of videos with topics from the text and presented by Triola (the author). These may be checked out for one hour and viewed.(2) A web cite is available for resources. http://www.awlonline.com/triola. (3) There is a single Math 107 conference cite through LearnLink for students enrolled in Math 107.

Office Hours: Check with your instructor. Offices are located on the first floor of Seney Hall.

Topics and Homework Assignments

1/17, 19, 22 (W, F, M) Introduction to Statistics
       Read Chapter 1
       Section 1-2, p. 10: 1-20
       Section 1-3, p. 15: 1-16

       Descriptive Statistics
       Section 1-4, p. 23: 1-25
       Review, p. 26: 1-6; Cumulative, p. 28: 1-8
       Read Chapter 2
       Section 2-2, p. 40: 1,5,9,13,15,17,19,21,22
       Section 2-3, p. 51: 5,7,13,14,17,24

1/24, 26, 29 (W, F, M) Descriptive Statistics
       Section 2-4, p. 65: 3,8,9,14,17,18,23
       Section 2-5, p. 81: 3, 8, 9, 20-25, 29, 32, 34
       Section 2-6: p. 91: 1, 3, 6
       Review, p. 106: 1-4, 6
       Notes for Descriptive Statistics

       Counting
       Read Chapter 3
       Section 3-7, p. 164: 1-30

1/31(W) Review for Test 1

Test 1 at 2:15 on Friday, February 2 in Seney Hall in assigned rooms.
       (Chapters 1, 2 and counting)

Section II

2/5, 7, 9 (M, W, F)Laws of Probability
      Section 3-2, p. 123: 1-30, 34
      Section 3-3, p. 132: 1-24, 25, 26
      Section 3-4, p. 140: 1-24, 25, 26, 27
      Section 3-5, p. 149: 1-20
      (Not 3-6)
      Chapter 3, p. 170: 1-16; p. 171: 1,2
      Notes for Counting and Probability

      Probability Distributions
      Read Chapter 4
      Section 4.2, p. 190: 1-10, 13, 16, 18, 19, 25
      Finish previous homework

2/12, 14, 16(M, W, F) Binomial and Poisson Distributions
      Section 4.3, p. 201: 1-10, 17-20, 25-36 (Use method 1)
      Section 4.4, p. 207: 1-16, 17
      Section 4.5, p. p. 213: 1-10
      Chapter 4, p. 217: 1-5

      Normal Distribution
      Read Chapter 5
      Section 5.2, p. 239: 1-40, 41, 43
      Section 5.3, p. 245: 1-24
      Section 5.4, p. 252: 1-10, 17-19, 21, 23

2/19(M) Central Limit Theorem, Normal Approximation to the Binomial
      Section 5.5 p. 263: 1-20
      Section 5-6, p. 275: 1-20, 24
      Chapter 5, p. 286: 1-10, p. 288: 1,2;
      Notes for Probability Distributions

2/21(W) Review
      Experiment 1 assigned

Test 2 at 2:15 on Friday, February 23 in Seney Hall in assigned rooms.
      (Chapter 3, 4, 5)

Section III

3/26,28 (M, W) Confidence Intervals-Means
    Read Chapter 6
    Section 6-2, p. 309: 1-25
    Section 6.3, p. 320: 1-16, 21, 23, 25, 26, 27
    Section 6.4, p. 327: 1-10

3/2, 5(F, M) Confidence Intervals - Proportion and Introduction to Hypothesis Testing
    Section 6.5: p. 337: 1-6, 11, 12, 15-22, 27-34, 41
    (Not 6.6)
    Chapter 6: p. 355: 1-10, p. 357: 1 (not l), 2
    Read Chapter 7
    Section 7.2, p. 378: 1-36, 37, 39

3/7, 9(W, F) Hypothesis Testing-Means
    Sectopm 7-3, p. 394: 1-20 odd
    Section 7-4, p. 405: 1-21 odd, 30
    Experiment 1 due

SPRING BREAK - 3/12 - 3/16

3/19(M) Hypothesis Testing - Proportions
    Section 7-5, p. 414: 1,2,10,11,18,19
    Chapter 7, p. 426: 1-10; p. 429: 1-4
    Notes for Inference 1

3/21 (W) Review

Test 3 at 2:15 on Friday, March 23 in Seney Hall in assigned rooms
    (Chapters 6 and 7)

Section IV

3/26, 28, 30 (M, W, F) Inferences from Two Samples (Sections 8.2, 8.3)
    Read Chapter 8
    Section 8.2, p. 444: 1-15 odd
    Section 8.3, p. 454: 1-13 odd, 12, 14

    Inferences from Two Samples
    Section 8.4, p. 466: 1-15 odd, 18
    Section 8.5, p. 476: 1, 3, 4, 5, 9, 11, 16

4/2, 4, 6(M, W, F) Inference from Two Samples
Section 8.6(not case 3), p. 488: 1, 3, 5, 6, 7, 8, 9
Chapter 8, p. 494: 1-7; p. 497: 4
Notes for Inference 2

Correlation and Regression (formal hypothesis testing)
Read Chapter 9
Section 9.2, p. 520: 1-15 odd and find t-values, 17-20 all, 23
Section 9.3, p. 535: 1,5,9,11,15,17
Experiment 2 assigned

4/9(M) Regression
Section 9.4, p. 545: 1-8, 9
Section 9.5, p. 555: 1-4, 5-8
Section 9.6, p. 562: 5-8
Chapter 9, p. 565: 1, 5-8

4/11(W) Review

Test 4 on Friday, April 13 at 2:15 in assigned rooms.
   (Chapter 8 and 9)

<u>Section V</u>

4/16 (M) Contingency Tables
Read Chapter 10
Section 10.2, p. 584: 1-4, 9, 13
Section 10.3, p. 598: 1-11 odd, 15
Chapter 10, p. 605: 1-5
Experiment 2 due

4/18 (W) ANOVA
Read Chapter 11
Section 11.2, p. 626: 1,2,3 (put in table form), 7
Section 11.3, p. 638: 1-8
Notes on Additional Parametric Models

4/20(F)Wilcoxon Test and Kruskall-Wallis
Read Chapter 13
Section 13.4, p. 708: 1-4 all
Section 13.5, p. 716: 1,3,7
History Section of Notebook

4/23 (M) Rank Correlation
    Section 13.6, p. 726: 1,2,7,8,13,14
    Chapter 13, p. 741: 4,9,11,12
    Read pages 756-759
    Notes for Nonparametric Models

4/25(W) Review

Test 5 on Friday, April 27 at 2:15 in assigned room.
    (Parts of Chapters 10, 11 and 13)

4/30(M) Last Class Day
    Test 5 Returned