Mathematics 107 - Introduction to Probability and Statistics
Spring, 2002

Instructor: Dr. Michael Rogers
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Office Hour: To be announced or by appointment

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

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

Other Resources:
(1) The library has on reserve a set of videos and CDs with topics from the text and
     presented by Triola (the author) and others.
(2) Companion web site of the textbook: http://www.awlonline.com/triola

Course Content: 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.

Goals: 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.

Classes: Class attendance and consistent preparation for class will determine the success or failure the student realizes in this course. Students are expected to attend all classes and are responsible for all material covered in class as well as any changes made in the

schedule regarding homework, experiments and other dates. <u>Missing more than three classes without legitimate reasons will result in an appropriate academic penalty.</u>

Class time will be used to enrich topics in statistics but will not be used to summarize information from the text. <u>It is your responsibility to read the textbook.</u>

<u>Homework</u>: A homework assignment is due almost every day of class at the end of class. Generally all that will be recorded is whether the assignment was done. However, persistently shoddy work will be brought to the attention of the student and may be factored into the homework portion of the grade. The student must be present in class to turn in the homework. Late homework will not be accepted. Collaboration is allowed and encouraged. Working in groups can be an effective learning tactic. However, each student must write his or her own solutions.

Basic problems and listings of the information for which you are responsible are included in the <u>Math107 Notebook</u>. You will need to stay current with the assignments in the notebook.

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

<u>Tests:</u> Each test is worth 100 points and will be given on the following Fridays in Seney Hall: **at 2:15 on February 1, February 22, March 22, April 12, and April 26**. Tests should take around 75 minutes. <u>There is no provision for making up tests.</u> Emergencies will be handled on an individual basis.

<u>Experiments:</u> Each experiment is worth 50 points. Example experiments are provided in the notebook for this course. Experiments involve group work <u>can not be made up</u>. You <u>must be present</u> on the day the experiment is assigned to be in a group and have a grade for the assigned experiment.

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 <u>must</u> accompany each experiment. <u>No experiment will be accepted after the due date and time.</u>

<u>Excuses:</u> Any conflicts, problems, or emergencies deemed legitimate by the instructor will be handled according to the individual circumstances. The student is expected to take all tests and exams at the scheduled times. For legitimate excuses arrangements will be made to take a test <u>prior to</u> the testing time. <u>There will be no make-up tests given after the testing time.</u>

Final Exam: A cumulative final exam will be given at the time scheduled by the Registrar.

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

Tutors: Student tutors are scheduled for a limited amount of time per week, 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.

Grading: Grades will be determined by student performance on homework, five tests, two experiments and a comprehensive final exam:

Homework	100
5 tests @ 100 each	500
2 experiments @ 50 each	100
Final Exam	200
	900

The following scale will be used to assign letter grades:

A: 810 – 900   points
B: 720 – 809   points
C: 630 – 719   points
D: 540 – 629   points
F: Below 540 points

Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near the above cutoffs in total points.

HONOR CODE: THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT POINTS TOWARD YOUR GRADE. ALL SUCH WORK WILL BE PLEDGED TO BE YOURS AND YOURS ALONE OR THAT YOUR CONTRIBUTIONS ON ANY EXPERIMENT ARE HONESTLY STATED. YOU PLEDGE THAT WITH YOUR SIGNATURE.

<center><u>Proposed Calendar</u></center>

Section I

1/16 (W) Introduction to Statistics   Section 1-1, 1-2 and 1-3

1/23 (W) Descriptive Statistics   Section 1-4, 2-1, 2-2, and 2-3

1/28 (M) Descriptive Statistics   Section 2-4, 2-5, and 2-6
Math107 Notebook   Notes for Descriptive Statistics

1/30 (W) Counting   Section 3-7

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

Section II

2/4 (M) Laws of Probability   Section 3-1, 3-2, 3-3, 3-4, and 3-5(Not 3-6)
Math107 Notebook   Notes for Counting and Probability

2/6 (W) Probability Distributions   Section 4-1 and 4-2

2/11 (M) Binomial and Poisson Distributions   Section 4-3, 4-4, and 4-5

2/13 (W) Normal Distribution   Section 5-1, 5-2, 5-3, and 5-4

2/18 (M) Central Limit Theorem, Normal Approximation to the Binomial Distribution
        Section 5-5 and 5-6
Math107 Notebook   Notes for Probability Distributions

2/20 (W) Review for Test 2
    Experiment 1 assigned

Test 2 at 2:15 on Friday, February 22 in Seney Hall in assigned rooms.
    (Chapter 3, 4, 5)

Section III

2/25 (M) Confidence Intervals - Means   Section 6-1, 6-2, 6-3, and 6-4

2/27 (W) Confidence Intervals - Proportion and Introduction to Hypothesis Testing
        Section 6-5 (Not 6-6), Section 7-1 and 7-2

3/4 (M) Hypothesis Testing - Means   Section 7-3

3/6 (W) Hypothesis Testing - Means   Section 7-4
   Experiment 1 due

SPRING BREAK 3/11 - 3/15

3/18 (M) Hypothesis Testing - Proportions   Section 7-5
Math107 Notebook   Notes for Inference 1

3/20 (W) Review for Test 3

Test 3 at 2:15 on Friday, March 22 in Seney Hall in assigned rooms
   (Chapters 6 and 7)

Section IV

3/25 (M) Inferences from Two Samples - Means Sections 8-1, 8-2 and 8-3

3/27 (W) Inferences from Two Samples - Proportions Section 8-4 and 8-5

4/1 (M) Inference from Two Samples - Two Means Section 8-6(not case 3)
Math107 Notebook   Notes for Inference 2

4/3 (W) Correlation and Regression (Formal Hypothesis Testing)
            Section 9-1, 9-2 and 9-3
   Experiment 2 assigned

4/8 (M) Regression   Section 9-4, 9-5 and 9-6

4/10 (W) Review for Test 4

Test 4 at 2:15 on Friday, April 12 in Seney Hall in assigned rooms.
   (Chapter 8 and 9)

Section V

4/15 (M)
Multinomial Experiments and Contingency Tables Section 10-1, 10-2 and 10-3
Analysis of Variance (ANOVA)   Section 11-1, 11-2 and 11-3
Math107 Notebook   Notes on Additional Parametric Models
   Experiment 2 due

4/17 (W)
Nonparametric Statistics — Wilcoxon Rank-SumTest and Kruskall-Wallis Test
Section 13-1, 13-4 and 13-5
Math107 Notebook   A Brief History of Mathematics

4/22 (M)
Nonparametric Statistics — Rank Correlation   Section 13-6
Read Section 14-2, pages 756-759:   Which Procedure Applies?
Math107 Notebook   Notes for Nonparametric Models

4/24(W) Review for Test 5

Test 5 at 2:15 on Friday, April 26 in Seney in assigned room.
   (Parts of Chapters 10, 11 and 13)

4/29 (M) Last Class Day
       Test 5 Returned