Mathematics 107 - Introduction to Probability and Statistics
Fall, 1998 - Drs. Robert E. or Evelyn C. Bailey

Text: Elementary Statistics, 7th ed. Mario F. Triola [Optional: Solutions Book]

Materials: Calculator* and Math 107 Notebook

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).

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.

Grading: 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,	
3 experiments @ 100	300	A, A-:	900 points and above
1 final	300	B+, B, B-:	800 - 899 points
	1000 points	C+, C, C-:	700 - 799 points
		D+, D:	600 - 699 points
		F:	below 600 points

Each test will have 100 points and will be given on the following Fridays at 2:15 in Seney Hall: September 11, October 2, October 23, November 6, December 4. 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.

* The calculator needs to include: mean, standard deviation, permutations, combinations, correlation and regression. [TI-83 is recommended, TI-82 is acceptable]

Each experiment has a potential of 100 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 your own formula sheets that are provided and calculator for each test, experiment, and the final exam. Room assignments are as follows: Seney 208 (9:30 TTh E.C. Bailey), Seney 209 (11:00 TTh, E.C. Bailey), Seney 215 (9:30 TTh and 11:00 TTh, R.E. Bailey), Seney 310 (if needed).

Homework: The textbook homework problems will not be collected but are to benefit you. Review problems 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 hours outside of class for every class meeting, or around 6 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 is **no provision for making up tests.** You must be present in order to take tests. Experiments involve group work that **can not be made up**.

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.

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

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. YOU PLEDGE THAT WITH YOUR SIGNATURE.

Topics and Homework Assignments

Section I

8/27 (Th) Introduction to Statistics
Read Chapter 1
Section 1-2, p. 9: 1-18
Section 1-3, p. 14: 1-12
Section 1-4, p. 23: 1-16; p. 27: 1-8 (with your calculator)
Review, p. 29: 1-8; Cumulative, p. 31: 1, 2; p. 33: 3 (be able to answer)

9/1 (Tu) Descriptive Statistics
Read Chapter 2
Section 2-2, p. 43: 1, 5, 9, 21
Section 2-3, p. 55: 3, 5, 19, 20
Section 2-4, p. 69: 1, 5, 7, 17

9/3 (Th) Descriptive Statistics
Section 2-5, p. 87: 1, 5, 7, 21, 22, 25, 27* **(This formula is important)**
Review, p. 111: 1, 2, 3, 7, 9; p. 113: 1, 2
Notes for Descriptive Statistics

9/4 **(Fri) Help Session at 2:15 in room 215:** Calculator help. Be able to work problems like those on p. 27 and be able to find the mean, standard deviation of a data set.

9/8 (Tu) Fundamentals and Counting
Read Chapter 3
Section 3-2, p. 130: 3, 4, 5, 7, 11, 17, 19, 23, 26
Section 3-6, p. 168: 1-39 odd, 41, 43

9/10 (Th) Review for Test 1
Experiment 1 assigned - due 9/22

Test 1 at 2:15 on September 11 in Seney Hall
(Chapters 1 and 2)

Section II

9/15 (Tu) Laws of Probability
Section 3-3, p. 139: 1, 3, 5, 7, 9, 11, 13, 15, 17-24 all, 25, 27
Section 3-4, p. 151: 1-23 odd, 25-30, 31, 33
(Not 3-5)
Chapter 3, p. 173: 1-8, 9, 11, 13; p. 175: 1, 3
Notes for Counting and Probability

9/17 (Th) Probability Distributions
Read Chapter 4
Section 4.2, p. 193: 5, 7, 9, 13, 15
Section 4.3, p. 206: 1-8, 9, 11, 13, 15, 21, 23, 25, 27
Section 4.4, p. 215: 1, 3, 5, 9, 13, 15, 17

9/18 **(F) Help Session at 2/15 in room 215 for Chapter 3 questions**

9/22 (Tu) Poisson Distributions
Section 4.5: 1, 3, 5, 7, 9, 11, 13
Chapter 4, p. 221: 1, 3; p. 222: 1
Experiment 1 due

9/24 (Th) Normal Distribution
Read Chapter 5
Section 5.2, p. 240: 5-28 all
Section 5.3, p. 246: 1-19 odd
Section 5.4, p. 252: 5-15 odd

9/25 **(F) Help Session at 2:15 in room 215 for Chapter 4 questions**

9/29 (Tu) Central Limit Theorem, Normal Approximation to the Binomial
Section 5.5 p. 262: 1-19 odd
Section 5-6, p. 273: 1-27 odd, 31
Chapter 5, p. 278: 1-10 all, p. 279: 1, 2
Notes for Probability Distributions

10/1 (Th) Review

Test 2 at 2:15 on Friday, October 2 in Seney Hall in assigned rooms
(Chapters 3, 4, 5)

Section III

10/6 (Tu) Confidence Intervals (Chapter6)
Read Chapter 6
Section 6-2, p. 301: 1-27 (odd)
Section 6.3, p. 313: 1-19 (odd)
Section 6.4, p. 321: 1-27 (odd)
(Not 6.5)
Chapter 6, p. 337: 1a, 1c, 2, 3, 5, 6, 7, 8, 9, 10; p. 339: 2

10/8 (Th) Hypothesis Testing-Means (Sections 7.1, 7.2)
Read Chapter 7
Section 7.2, p. 357: 1-3, 5-7 (all, a, b, c, d); 9-16 all

Midsemester Break 10/12 and 10/13

10/15 (Th) Hypothesis Testing-Means (Sections 7.3, 7.4)
Section 7-3, p. 372: 1-23 odd
Section 7-4, p. 383: 1-23 odd

10/16 **(F) Help Session at 2:15 in room 215 for Chapter 6 questions**

10/20 (Tu) Hypothesis Testing - Proportions (Section 7.5)
Section 7-5, p. 392: 1-19 (odd), 23
Chapter 7, p 405: 1, 3, 5, 9, 10; p. 407: 1, 3, 4
Notes for Inference 1

10/22 (Th) Review
Experiment 2 assigned - due 11/5

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

Section IV

10/27 (Tu) Inferences from Two Samples (Sections 8.2, 8.3)
Section 8.2, p. 421: 1, 3, 5, 7, 11
Section 8.3, p. 432: 1, 3, 5, 7, 9, 11, 13, 15, 17

10/29 (Th) Inferences from Two Samples (Sections 8.4, 8.5)
Section 8.4, p. 440: 1, 3, 7, 9
Section 8.5, p. 454: 1, 7, 11, 13
(Not Case 3)

11/3 (Tu) Inference from Two Samples (Section 8.6)
Section 8.6, p. 465: 1-15 odd
Chapter 8, p. 469: 1-8, 9 (can't compare means), 10; p. 471: 1
Notes for Inference 2

11/5 (Th) Correlation [Use Formal Hypothesis Testing Procedures] (Sections 9.1, 9.2)
Section 9.2, p. 490: 1-11 (odd), 23, 25
Experiment 2 due

11/6 (F) Help Session at 2:15 in room 215 on Chapter 8

11/10 (Tu) Simple Regression (Sections 9.3, 9.4)
Section 9.3, p. 505: 1-11 (odd)
Section 9.4, p. 514: 1, 3, 7, 9a, 11a
Chapter 9, p. 527: 1, 2, 3, 5

11/12 (Th) Review

11/13 **Test 4 on Friday, November 13 at 2:15 in assigned rooms**
(Chapters 8, 9)

Section V

11/17 (Tu) ANOVA (Section 11.3)
Section 11.2 p. 597: 1-13 (odd), 16
Notes on Additional Parametric Models
Experiment 3 assigned - due 12/3

11/19 (Tu) Wilcoxon Test and (Section 13.4)
Section 13.4, p. 665: 1-17 (odd)

11/20 **(F) Help Session at 2:15 in room 215**

11/24 (Tu) Kruskall-Wallis Test (Section 13.5)
Section 13.5, p. 673: 1-17 (odd)
Chapter 13, p. 697: 1, 2, 7; p. 700: 2b, 2c, 2d; p. 702 parts b and c
Read pages 707-709

Thanksgiving Break 11/25 - 11/29

12/1 (Tu) Contingency Tables (Section 10.2, 10.3)
Section 10.2, p. 546: 1-15 (odd)
Section 10.3, p. 561: 1-13 (odd)
Chapter 10, p. 566: 1-5 (all)
Notes for Nonparametric Models

12/3 (Th) Review
Experiment 3 due

Test 5 on Friday, December 4 at 2:15 in assigned rooms.
(Parts of Chapters 9, 10, 11, 13)

12/8 (Tu) Last Class Day