Mathematics 107 - Introduction to Probability and Statistics
Spring, 2013
Dr. Michael Rogers

Text and materials: *Elementary Statistics*, 11th ed., Mario F. Triola;
Calculator (TI-83, TI-83 PLUS, TI-84 or TI-84 PLUS).

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), Chi Square Tests (Goodness-of-fit, Contingency Tables), Nonparametric methods (Wilcoxon [for independent samples], Kruskal Wallis, Spearman's rho). Emphasis is on inference.

Goals:
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 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.

The general goal for students taking this course is for students to begin to be good consumers of information through gaining knowledge about statistics.

Responsibilities:

Each **student** has the following responsibilities:
1. Come prepared and on time to every class.
2. Complete all work on time with proper thought.
3. Consider that it is not always the fault of the instructor if the student doesn't understand the material.
4. Treat the instructor and peers with respect.

5. Ask questions. Asking questions is a sign of maturity, not ignorance, as long as the student thinks clearly before asking.

6. Understand that the instructor is not trying to "nit pick" when grading and remember that grading is the responsibility of the instructor.

The **instructor** has the following responsibilities:

1. Come prepared to every class.

2. Design each class so students can accomplish the cognitive objectives listed in the syllabus.

3. Provide appropriate tips for studying and study materials as seem appropriate.

4. Create a mutually respectful classroom environment.

5. Return tests and experiments in a timely manner so that students will know their grades.

6. Grading, as far as possible, to be consistent and impersonal even though students might not agree with the decisions concerning partial credit.

Grading:

Grades will be determined by student performance as follows:

4 tests @ 100	400	In general,	
4 experiments @50	200		A, A-: 720 points and above
Final exam	200		B+, B, B-: 640–719 points
Total	800		C+, C, C-: 540–639 points
			D+, D: 480–539 points
Exact cut-off scores for plus and minus will			F: below 480 points

be determined by the distribution of totals for all students.

Tests and Final Exam:

Tests will be given during class time on the dates indicated on the attached listing of topics. Each test will cover the topics listed for that test on the attached outline. There are no practice tests or additional problems outside those in the text and formal typed notes. Formulas will be provided and your calculator may be used for appropriate portions of tests. You are expected to take tests at the scheduled times. Any emergencies will be handled on an individual basis and must be documented. The final exam will include material selected from the entire course.

Group Assignments:

There will be four group assignments, with students working in groups of two or three. Within the group, each student is expected to work as a group member on each aspect of each assignment (experiment, set of problems, and/or article(s)) and to participate in a somewhat "equal" manner. A signed statement of individual contributions must accompany each experiment. **No assignment will be accepted after class time on the due date.**

An individual's grade is based on: the individual's contribution and work within the group, the group's write-up, the statistical analysis used, the experimental procedure

outlined and followed, creativity including originality and neatness, clarity of work on problems, completeness of ideas on written responses, and correctness of work.

Homework:

Class time will be used to enrich topics in statistics but will not be used to merely summarize information from the text. It is each student's responsibility to read the appropriate sections of the textbook and make appropriate notes. Homework problems will not be collected but are to benefit the student. Each student should work most of the problems assigned in the text and in the formal typed notes. Example problems will be worked in class, one for each major concept. However, there is little or no class time for working through homework problems. Basic problems and concepts for which the student is responsible are included in the formal typed notes for this course, available on the class conference.

To do well, the average student will need to study about 3 hours outside of class for every class meeting. Preparing group assignments, studying and reviewing for tests will require more time. Each student should make sure he or she has sufficient time to do well.

Class Website:

There is a class website on **BlackBoard**. Students should consult this site frequently for announcements, typed notes, class notes, outlines for tests, etc. The site is where students may find homework assignments, typed notes for each section, and daily class notes.

Attendance Policy:

You are expected to attend all classes since you are responsible for work covered in class. Tests will not be given after the test day (listed on this syllabus). Emergencies are at the discretion of the professor. Absences from tests must have appropriate documentation.

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. THE CONTRIBUTION SHEET WITH EACH OF YOUR GROUP ASSIGNMENTS PROVIDES YOUR INDIVIDUAL WORK WITHIN THE GROUP STRUCTURE.

Topics

Counting and Probability

1/15 (Tues.)	Introduction to Statistics, Jerome Cardan, the famous birthday problem Counting 　　　　Section 4.7
1/17, 1/22 (Thurs., Tues.)	Laws of Probability, Birthday problem again, Craps, 　　　　Sections 4.2, 4.3, 4.4, 4.5, 4.8
1/24, 1/29 (Thurs., Tues.)	Discrete Distributions, 　　　　Sections 5.2; 5.3, 5.4; 5.5 **Experiment 1 assigned 1/24**
1/31 (Thurs.)	Review for test **Experiment 1 due**
2/5 (Tues.)	**Test 1**

Descriptive Statistics, Normal Distribution

2/7 (Thurs.)	Introduction to Statistics; Histograms 　　　　Chapter 1 and Sections 2.5, 2.2, 2.3
2/12 (Tues.)	Descriptive Statistics 　　　　Sections 3.2, 3.3
2/14, 2/19 (Thurs., Tues.)	Normal Distribution, CLT 　　　　Sections 6.1, 6.2, 6.3, 6.4, 6.5 **Experiment 2 assigned 2/14**
2/21 (Thurs.)	Review for test **Experiment 2 due**
2/26 (Tues.)	**Test 2**

Proportions and Hypothesis Testing

2/28 (Thurs.)	Normal Approximation to the Binomial; CI Proportions 　　　　Section 6.6, 7.2
3/5 (Tues.)	Hypothesis Testing, Theory 　　　　Section 8.2 **MUST READ BEFORE CLASS**

| 3/7 (Thurs.) | Hypothesis Testing, one and two sample proportions |
| | Sections 8.3, 9.2 |

| **3/11 – 3/15** | **Spring Break** |

3/19 (Tues.)	Chi Square Models
	Sections 11.2, 11.3
	Experiment 3 assigned

Means and Hypothesis Testing

| 3/21 (Thurs.) | CI and Hypothesis Testing, one sample means |
| | Sections 7.3, 7.4, 8.4, 8.5 |

| 3/26 (Tues.) | Review for test |
| | **Experiment 3 due** |

| **3/28 (Thurs.)** | **Test 3** |

| 4/2, 4/4 (Tues., Thurs.) | Hypothesis Testing, two sample means |
| | Sections 9.3, 9.4, 9.5 |

Regression Models

| 4/9 (Tues.) | Simple Linear Regression |
| | Sections 10.2, 10.3 |

4/11 (Thurs.)	ANOVA
	Section 12.2
	Experiment 4 assigned

Non-parametric Models

| 4/16 (Tues.) | Kruskal Wallis, Wilcoxon, Spearman rho |
| | Sections 13.5, 13.4, 13.6 |

| 4/18 (Thurs.) | Review for test |
| | **Experiment 4 due** |

| **4/23 (Tues.)** | **Test 4** |

| 4/25 (Thurs.) | Wrap-up, review, evaluation |

| 5/8 (Thurs.) | **FINAL EXAMINATION 9:00 – 12:00** |
| | **GOOD LUCK TO ALL!** |