Instructor: Sally C. Morton, Professor and Chair, Department of Biostatistics
Graduate School of Public Health (GSPH)
Parran 310, 130 DeSoto Street
scmorton@pitt.edu
Assistant: Bernadette Kapko (bek17@pitt.edu)
Office hours: Monday 10:30am-noon and Wednesday, 3:30-5pm and by appointment. Please check Courseweb frequently for office hour changes.

Teaching Assistants (TAs):
Clair Smith and Di Zhang, Crabtree A443, office hours TBA on Courseweb.

This text will be used for BIOST 2042. The book is on reserve at the Pitt Health Sciences Library at 200 Scaife Hall, 3550 Terrace Street, Pittsburgh, PA 15261.

Software: Stata Version 13. Please procure from the University Software Download Service on my.pitt.edu.

Class Meetings:
Mondays and Wednesdays, 5:35 – 6:50 PM
Graduate School of Public Health G23

The first meeting of the class will be August 25, and the last meeting will be the third exam on December 10.
Please note class will begin promptly at 5:35pm to allow students travel time from another required class.
Please note the University has a holiday on Monday, October 13, and requires that Monday classes meet on Tuesday, October 14 (Tuesday classes do not meet this week). Thus we will not have class on October 13, and we will have class on October 14.

Recitations: Class recitations will be held after lecture (7 PM to 7:50 PM) on Wednesdays. We will occasionally cancel recitation depending on the class progression. The first recitation will be Wednesday, September 3.

Course website:
All class material will be placed on Courseweb. Please check regularly.

The Courseweb announcement mechanism will be used to send messages about class. Only in the event of a time-dependent event (e.g., class canceled due to weather), will email be sent out to the class. Course-related email will be sent to your “pitt.edu” address only.
Course Prerequisites, Description and Goals:

BIOST 2041 is an introductory applied biostatistics course for public health students and health career professionals who will make use of statistical methods in research projects or in interpreting literature. This class is for students needing a more research-oriented approach than that provided in BOST 2011 (Principles of Statistical Reasoning). The prerequisites are secondary school (high school) algebra. The tools and concepts presented in BOST 2041 will serve as a prerequisite to BOST 2042, which is taught in the spring term. Together, BOST 2041 and BOST 2042 introduce students to the statistical methods most widely used in medical and public health research.

The overall purpose of this course is to introduce students to basic probability and one and two sample procedures (point and interval estimation and hypothesis testing) for the Normal and Binomial distributions. Basic one and two sample nonparametric tests are also presented. This broad goal includes use of statistical software to analyze data sets and answer research questions; recognition of situations when these procedures are and are not appropriate; and intuitive understanding of the rationale used in creating the statistical procedures presented.

Specific Course Objectives:

The following objectives are phrased in terms of the Association of Schools and Programs of Public Health (ASPPH) competencies for biostatistics. Applied to BOST 2041, they should be understood to refer to one and two sample procedures pertaining to the Normal and Binomial populations.

At the conclusion of this course, a student should be able to

1. Describe basic concepts of probability, random variation, and commonly used statistical probability distributions.
2. Describe preferred methodological alternatives to commonly used statistical procedures when assumptions are not met.
3. Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.
4. Apply descriptive techniques commonly used to summarize public health data.
5. Apply common statistical methods for inference.
6. Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.
7. Interpret results of statistical analyses found in public health studies.
Course Policies:

1. All work submitted on homework and exams must be your own. For homework, we encourage you to work together to solve the problems. When you write up the assignment, however, do any necessary computer work and write the answers yourself. This policy exists for two reasons. First, we want your grade to represent your own work. Second, it is important to know how to write up the major features of an analysis and doing so on your own for homework is a good way to get more comfortable with this process. Violation of this policy will make you subject to disciplinary action (including dismissal) by the GSPH.

2. All students are expected to adhere to the school’s standards of academic honesty. Any work submitted by a student for evaluation must represent his/her own intellectual contribution and efforts. The academic integrity policy is given on Courseweb. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

3. If you have a disability for which you are requesting an accommodation, please notify the instructor and Disability Resources and Services no later than the second week of term. DRS will verify your disability and determine reasonable accommodations for this course.

4. Specific guidelines for the exams will be discussed in class, and will be written on all exams. In short: All exams are closed book; you will be permitted to bring in notes of prespecified length. No cell phone use (including the calculator function). Please use a regular (not cell phone) calculator if you wish. No computer use allowed. No texting or use of internet while taking exams.

5. Homework will be due in class on the announced due date. Bring a hard copy (paper) of your homework to class and hand it in at the beginning of class. Make a copy of your homework if the due date is close to an exam date. Homework solutions will be posted after class and homework submitted after posting will not be accepted. If you cannot attend class on the day the homework is due, email your homework to the instructor prior to the start of class.

6. Please set pagers & cell phones to a silent mode during class. If you need to work on a non-class-related activity, please leave the lecture hall.

7. To ensure the open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student’s own private use. If you would like to record class, please email the instructor to obtain permission.
Course Requirements and Grading:

There will be 3 in-class exams and 6 homework assignments. The contribution of each of these assessments toward the final grade will be as follows:

- 1/4 Homework
- 1/4 Exam 1 on 9/29/14
- 1/4 Exam 2 on 11/3/14
- 1/4 Exam 3 on 12/10/14

All “for credit” grades will be letter grades only. The grading scheme will be:
- A if greater than or equal to 90;
- B if greater than or equal to 80 and less than 90;
- C if greater than or equal to 70 and less than 80;
- F if less than 70.

Rescheduling an exam will not be permitted except in rare circumstances. Please notify the instructor as soon as possible if you wish to discuss possibly rescheduling.

Homework will be graded dichotomously:
- A homework handed in and all required problems attempted will receive a score of “1.”
- A homework not handed in and/or handed in but not all required problems attempted will receive a score of “0.”

We will provide feedback on your work but will not grade problems. We have found we will be more helpful to you if we provide detailed feedback and work with you in office hours as appropriate.

One homework assignment will be dropped from your homework grade. In other words, your best 5 homeworks will contribute toward your homework grade. This gives you an opportunity not to turn in an assignment. We encourage you to do all assignments, even if you do not hand them all in.

You are responsible for the material presented in class, and on homework assignments.

Suggestions for Succeeding in the Class:

1. Review the lecture and recitation notes and text, and attend class. Although the lecture and recitation notes will be posted on Courseweb prior to class, there are often blank areas that are filled in during class. Annotated lecture and recitation notes will be posted on Courseweb after class as appropriate.

2. Keep updated on the class on Courseweb.

3. Obtain Stata and practice using it.
4. Read the textbook, especially if you are confused about a concept as it provides an alternative perspective to that presented in class.

5. Homework assignments will sometimes consist of two types of problems: required and practice. You are only required to do the required problems to receive full credit on your homework. However, if you are unsure of a concept, please resist the temptation to skip the practice problems. Also we advise doing all homeworks, even if you do not turn them all in.

6. Ask questions. You will help others in the class if you speak up.

7. Ask for help in office hours and for individual help if you need it. Ask early. Monitor your grade on Courseweb and if you are concerned about your performance, discuss your situation with the instructor.
Course Schedule:

The dates in the following schedule are targets only. Please also review the draft calendar. The course may actually proceed faster or slower depending on the needs of the class.

<table>
<thead>
<tr>
<th>Approximate Dates</th>
<th>Topic(s) and Readings. (Chapter and section (§) numbers refer to textbook.)</th>
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<tbody>
<tr>
<td>August 25 – September 3</td>
<td>Unit 1. Course Introduction. (Chapter 1)</td>
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<td>Unit 1. Introduction to Stata</td>
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<td>Unit 2. Descriptive Statistics (Chapter 2)</td>
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<td></td>
<td>a) Measures of central tendency and variability</td>
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<td>b) Presentations of distributional shape</td>
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<td>c) Exploration of relationships</td>
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<td>d) Exploring Data Quality</td>
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<td>September 8 – 10</td>
<td>Unit 3. Introduction to Probability (Chapter 3)</td>
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<td>a) Independent outcomes and conditional probability</td>
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<td>b) Mutually exclusive outcomes</td>
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<td>c) Complementary outcomes</td>
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<td>d) Applications, including screening</td>
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<td>September 15 - 22</td>
<td>Unit 4. Populations, sampling distributions, and the Normal distribution (§ 4.1, 4.5 – 4.7, 5.1 – 5.3)</td>
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| September 29       | Exam 1  
|                    | Covers Homeworks 1 and 2; Units 1, 2, 3 and 4.                             |
Course Schedule (continued):

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| September 24 – October 15 | Unit 5. One-sample inference for normal populations.  
  a) Inference about the mean of a normal population (§ 6.1 – 6.3, 7.1 – 7.2)  
  b) Inference about the variance of a normal population (§ 6.9, 7.7)  
  c) Assessing assumptions  
  d) Study planning and sample size calculations (§ 6.7 – 6.8) |
| October 20 – 29 | Unit 6. Two-sample inference for normal populations.  
  a) Inference about the means of two populations, paired samples (§ 7.4)  
  b) Inference about the means of two populations, independent samples, equal variances (§ 6.4, 7.3)  
  c) Inference about the variances of two populations (§6.10, 7.8)  
  d) Inference about the means of two populations, unequal variances (§ 6.4, 7.3)  
  e) Study planning and sample size calculations (§ 7.9, 7.10) |
| November 3 | Exam 2 
  Covers Homeworks 3 and 4; Units 5 and 6. |
Course Schedule (continued):

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<tr>
<td>November 5 – 19</td>
<td>Unit 7. Analysis of binomial data</td>
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<td>a) Binomial random variables (§ 4.3)</td>
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<td>b) Inference about a binomial proportion (§ 6.5, 7.5)</td>
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<td>c) Inference about two or more binomial proportions (§ 6.6, 7.6)</td>
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<td>d) Two-way contingency tables in general (§ 12.1 – 12.8)</td>
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<td></td>
<td>e) Study planning and sample size calculations (§ 6.8)</td>
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<td>November 24 – December 8</td>
<td>Unit 8. Nonparametric one and two sample procedures.</td>
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<td>a) Sign test (§ 13.1 – 13.3)</td>
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<td>b) Signed-rank test (§ 13.4)</td>
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<td>c) Median test (§ 13.5)</td>
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<td>d) Rank sum test (§ 13.6)</td>
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| December 10       | Exam 3  
|                   | Covers Homeworks 5 and 6; Units 7 and 8.                                        |