Syllabus
(9-7-2014)

Biost 2011

Introduction to Statistical Reasoning

University Of Pittsburgh
Graduate School of Public Health

Fall Semester 2014

Instructor: Vincent C. Arena, PhD
            Department of Biostatistics
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            voice: 412 624-5383
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            office hours: Tuesday 1 – 2:30
            and by appointment

Teaching Assistants:
Sammi Taylor
            Department of Biostatistics
            office: A443 Crabtree Hall
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            office hours: Monday 3:30-4:30 pm
            Weds 11:30 am-12:30 pm
            and by appointment

Michael Backman
            Department of Biostatistics
            office: A443 Crabtree Hall
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            office hours: Thurs 10:30 am-12 pm
            Friday 2-3:30 pm
            and by appointment

Class Lectures - location / time:
            Mondays: 5:30-7:25 pm
            Room A115 Crabtree Hall, GSPH

Recitation/Lab Sessions - location / time:
** Only need to attend one of the recitation sessions
            Wednesdays: 5:30-7:25 pm
            Thursdays: 8:30-10:25 am
            Room A115 Crabtree Hall
            Room A719 Crabtree Hall

Credit Hours:
3 credits hours

Required text:


The textbook is available at University of Pittsburgh Book Center and is required for the course. The content of the textbook and methods presented closely follow the lectures of the instructor. The textbook includes supplementary problems for students who wish additional practice beyond that in the homework assignments.
Website:

CourseWeb / Blackboard (notes, assignments & lecture material) can be accessed via the Pitt Portal at http://my.pitt.edu and selecting the CourseWeb link on the right hand side of the web page. Alternatively, you can directly go to the CourseWeb page at http://courseweb.pitt.edu

Other useful references:

* Minitab web site  [http://www.minitab.com](http://www.minitab.com)
* SPSS web site  [http://www.spss.com](http://www.spss.com)

Prerequisites:

College algebra or a higher-level math course with a grade of C or better. Students should have a basic understanding of the PC or Mac computer environment with some exposure to a current operating system.

*Scientific calculator*: If you do not already own a scientific calculator, you may need to purchase one for this course. Consider a calculator with at least one memory and a variety of mathematical functions.

*Computer Software*: The software for Biost 2011 (*Minitab* and/or *SPSS*) is available on all university supported computers in the labs and libraries.

  Personal copies of *Minitab* and/or *SPSS* can be purchased at a very reasonable price ($5) through the University of Pittsburgh Software Licensing Services at Bellefield Hall.

  Alternately, can be downloaded for free at [http://www.software.pitt.edu/](http://www.software.pitt.edu/)

  Additional information about software can be found at [http://www.technology.pitt.edu/software/for-students-software.html](http://www.technology.pitt.edu/software/for-students-software.html)

Course Rationale:

This is the Biostatistics core course for Graduate School of Public Health and provides a basic introduction to the concepts of statistical reasoning as applied to the study of public health problems.

This course is designed for public health students that expect to primarily be a future consumer of statistical procedures in the form of books, journal articles, reports, grants and the like; and, the ability to perform some basic analyses. Students who intend to be professional research workers in public health areas requiring the daily application of quantitative procedures and statistics should consider taking Biost 2041 and 2042 (Introduction to Statistical Methods I and II).
Course Description and Goals:

Founded on the lecture materials and recitation experiences, the student in Biostatistics 2011 will:

- Receive an introduction to the concepts and calculation of a broad variety of descriptive and inferential statistical methods used in the health sciences, demography, and clinical trials.
- Learn how to plan and how to present statistical methods and results in reports, journal articles and grant applications written by the student.
- Learn how to critically assess the statistical methods and results presented in professional journals, reports and grant applications, and in non-professional documents such as newspapers and popular magazines.
- Develop an awareness of the ethical dimensions of statistical practices.

Course Objectives:

After completing this course, the student will be able to properly:

- Design and interpret descriptive tables, plots, and exploratory data analyses.
- Identify the appropriate inferential statistical procedures to be applied in different public health data situations.
- Carry out quantitative hypothesis testing procedures, including, t-Tests, ANOVAs, and analyses of rates and proportions, and a variety of non-parametric statistical tests.
- Calculate and apply confidence intervals, sensitivity and specificity analyses, statistical power analyses, simple linear regression models, and basic survival analyses.
- Identify when data collection or statistical procedures are being inappropriately interpreted or misapplied.

Course Requirements:

- Lecture and recitation attendance.
- Satisfactory completion and submission of all homework assignments.
- Satisfactory performance on midterm exam and final exam.
- Satisfactory performance on Minitab/SPSS Final Project.
Student Performance Evaluation:

- Course grades are based on performance on: Midterm exam (approx. 30%); Final exam (approx. 45%); Minitab/SPSS Final Project (approx. 15%); Homework (approx. 10%)

- Examinations are open book and open notes. However the use of computers, cell phones or other internet-attached devices will NOT be permitted during examinations.

- Students who cannot be present on the day of the examination will be required to take the examination on the first earlier available date. Notification must be given to the instructor in advance.

- Midterm and Final Examinations consist of true/false, multiple choice, and calculation questions.

- Final Examination is comprehensive.

- Homework assignments will be graded. Assignments must be submitted on or before their due date. Late assignments will not be given credit. Assignments will be discussed during lab sessions by the teaching assistants and an answer sheet will be made available.

  **Course Grading Scale** (based on weighted total score)

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90 - 100%</td>
<td>A</td>
</tr>
<tr>
<td>70 - &lt;90%</td>
<td>B</td>
</tr>
<tr>
<td>60 - &lt;70%</td>
<td>C</td>
</tr>
<tr>
<td>50 - &lt;60%</td>
<td>D</td>
</tr>
<tr>
<td>&lt;50%</td>
<td>F</td>
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</tbody>
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Studying for this Course:

Biostatistics 2011 can be quite challenging for a student whose education has not emphasized quantitative skills. It is absolutely necessary that students complete the homework assignments before discussing them in the recitation periods or receiving the answer sheets. Students who understand how to do the homework problems should pass the course with an acceptable grade. Those who do not understand the homework problems will find the examination material difficult.

The course is cumulative so - do not fall behind. You can study together in groups but should do the homework independently. Students are strongly advised to review the sections of the textbook corresponding to the instructor's lectures prior to coming to class. The amount of time the student invests in the course should be relative to their background in math and quantitative procedures. It is not unusual for a student without a background in statistics or mathematics to spend 2-3 hours at home for every hour in the classroom.

The instructor and teaching assistants have weekly office hours. Be sure to use this time when you need clarification or help with the course material.
Academic Integrity Statement (Approved by EPCC):

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 GSPH policy on academic integrity, which is based on the University policy, is available online at http://www.provost.pitt.edu/info/acguidelinespdf.pdf. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

Students committing acts of academic dishonesty, including plagiarism, unauthorized collaboration on assignments, cheating on exams, misrepresentation of data, and facilitating dishonesty by others, will receive sanctions appropriate to the violation(s) committed. Sanctions include, but are not limited to, reduction of a grade for an assignment or a course, failure of a course, and dismissal from GSPH.

Disability:

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and the Disability Resources and Services (DRS) (http://www.studentaffairs.pitt.edu/drsabout) as early as possible in the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call 648-7890 to schedule an appointment. Their office is located in 140 William Pitt Union.

Video / Audio recording of class lectures:

Audio recording of the class is permissible provided you first receive approval from the course instructor. You also agree that the recording is for your own personal use and will not be redistributed in any form.

Video recording of the class, in full or in part, is NOT permitted.

Copyright of course material:

Unless otherwise stated all course material is protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See Library of Congress Copyright Office and the University Copyright Policy. As such the material is to be used for academic purposes only. Redistribution of this material to web sites and repositories (e.g., Course Hero) is strictly prohibited.
### Biost 2011

#### Schedule of Lectures

(tentative)

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Description</th>
<th>Reading</th>
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| 1       | Aug 25 | **Introduction/Overview**
|         |        | Populations and samples
|         |        | Types of data
|         |        | Organizing and displaying data                                             | Ch. 1-3   |
| 2       | Sept 8 | **Summarizing data**
|         |        | Probability                                                                  | Ch. 4 & 5 |
| 3       | Sept 15| **Normal distribution**
|         |        | Sampling distribution of means and estimation                               | Ch. 6 & 7 |
| 4       | Sept 22| **One-sample estimation and inference**
|         |        | Significance testing, point estimates & confidence intervals                | Ch. 8     |
| 5       | Sept 29| **Two-sample estimation and inference**
|         |        | Significance testing, point estimates & confidence intervals               | Ch. 9     |
| 6       | Oct 6  | **Analysis of variance**
|         |        | More than two samples                                                      | Ch. 10    |
| Mid-term exam | Oct 14 | **Mid-term exam**
|         |        | **** This is *Tuesday*, Oct. 14
|         |        | Exam begins at 5pm ********                                               |           |
| 7       | Oct 20 | **Inferences about proportions**
|         |        | One and two samples                                                        | Ch. 11    |
| 8       | Oct 27 | **Chi-square tests**                                                       | Ch. 12    |
| 9       | Nov 3  | **Correlation and linear regression**
|         |        | Examining the relationship between 2 variables                            | Ch. 13    |
| 10      | Nov 10 | **Nonparametric methods**
|         |        | What happens when assumptions are not met                                   | Ch. 14    |
| 11      | Nov 17 | **Life tables and survival analysis**                                      | Supplement|
|         | Nov 24 | **Tentative - No class**                                                   |           |
| 12      | Dec 1  | **Review before final exam**                                               |           |
| Final exam | Dec 8  | **Final exam**                                                             |           |