

Office of Public Health Studies, University of Hawaii at Manoa  
Department of Public Health Sciences  
PH 655 Biostatistics I  
Fall 2008 Syllabus

**Time:** Tuesday and Thursday, 10:30-11:45am --- Three (3) credit core course

**Meeting Place:** Biomed T208

**Instructor**

**Name:** Dongmei Li, M.S. Ph.D. Candidate  
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**Course site:** <https://laulima.hawaii.edu>  
**Office:** Biomed D104F  
**Office hours:** Tuesday and Thursday 1:30-2:30pm

**Course Description**

PH655 focuses on the basic biostatistics methods that can be applied to public health and biomedical research. Key topics include descriptive statistics, probability theories, common distributions, t-tests, one-way ANOVA, simple linear regression, and basic categorical data analysis methods. The course will provide you some basic tools to collect data, analyze data, and interpret results from analysis.

**Course Learning Objectives**

1. Distinguish different types of random variables and the difference between experimental studies and observational studies.
2. Compute standard descriptive statistics using a pocket calculator.
3. Apply t tests to test hypotheses about a mean or difference between means for three basic study designs (one sample, paired samples and two independent samples).
4. Use t distribution table to compute 95% confidence intervals for means and the difference between means.
5. Calculate sample size needed for a given power and Type I error rate for comparing two independent means with a t test.
6. Compute one-way analysis of variance using a pocket calculator.
7. Compute correlations between 2 random variables and fit simple linear regression model estimates.
8. Use normal approximation to test hypotheses about a proportion or difference between proportions for three basic study designs (one sample, paired samples and two independent samples).
9. Apply chi-square tests to test association between row and column variables.
10. Test for association between an exposure and an outcome in stratified 2 by 2 tables using the Mantel-Haenszel chi-square test.

**Textbook:** *Basic Biostatistics* by B. Burt Gerstman (Jones & Bartlett, 2008)

**Textbook Website:** <http://publichealth.jbpub.com/book/gerstman/staTable.cfm>

**PH 655 Course Schedule—Fall 2008--- (Revised as of August 22, 2008)**

<b>Date</b>	<b>Topic</b>	<b>Assignments</b>
Tuesday 8/26 Thursday 8/28 Week 1	<ul style="list-style-type: none"> <li>• General biostatistics concepts</li> <li>• Frequency distributions and summary statistics</li> </ul>	Read textbook chapter 1 – 4, and do problems in class handouts
Tuesday 9/2 Thursday 9/4 Week 2	<ul style="list-style-type: none"> <li>• Basic probability theory</li> <li>• Binomial probability distribution</li> </ul>	Read textbook chapter 5 – 6, and do problems in class handouts
Tuesday 9/9 Thursday 9/11 Week 3	<ul style="list-style-type: none"> <li>• Normal probability distribution</li> <li>• Sampling distribution of means; central limit theorem</li> </ul>	Read textbook chapter 7 – 8, and do problems in class handouts
Tuesday 9/16 Thursday 9/18 Week 4	<ul style="list-style-type: none"> <li>• Type I and Type II errors; power, one sample t tests</li> <li>• Paired and two independent samples t tests Part I</li> </ul>	Read textbook chapter 11 – 12, and do problems in class handouts
Tuesday 9/23 Thursday 9/25 Week 5	<ul style="list-style-type: none"> <li>• Paired and two independent samples t tests Part II</li> <li>• Review for Exam 1</li> </ul>	Read textbook chapter 12, and do problems in class handouts
Tuesday 9/30 Thursday 10/2 Week 6	<ul style="list-style-type: none"> <li>• <b>EXAM 1 (9/30 in class)</b></li> <li>• Comparing several means (One-way ANOVA) Part I</li> </ul>	Read textbook chapter 13, and do problems in class handouts
Tuesday 10/7 Thursday 10/9 Week 7	<ul style="list-style-type: none"> <li>• Comparing several means (One-way ANOVA) Part II</li> <li>• Scatter plots and correlation</li> </ul>	Read textbook chapter 13-14, and do problems in class handouts
Tuesday 10/14 Thursday 10/16 Week 8	<ul style="list-style-type: none"> <li>• Simple linear regression</li> <li>• Inference about proportions, Part I</li> </ul>	Read textbook chapter 14,16, and do problems in class handouts
Tuesday 10/21 Thursday 10/23 Week 9	<ul style="list-style-type: none"> <li>• Inference about proportions, Part II</li> <li>• Comparing two proportions, Part I</li> </ul>	Read textbook chapter 16-17, and do problems in class handouts
Tuesday 10/28 Thursday 10/30 Week 10	<ul style="list-style-type: none"> <li>• Review for Exam 2</li> <li>• <b>EXAM 2 (10/30 in class)</b></li> </ul>	Practice problems from class handouts
Tuesday 11/4 Thursday 11/6 Week 11	<ul style="list-style-type: none"> <li>• No class on 11/4</li> <li>• Comparing two proportions, Part II (Measuring of association in 2 by 2 table)</li> </ul>	Read textbook chapter 17, and do problems in class handouts
Tuesday 11/11 Thursday 11/13 Week 12	<ul style="list-style-type: none"> <li>• No class on 11/11</li> <li>• Cross-tabulated counts, Part I</li> </ul>	Read textbook chapter 18, and do problems in class handouts
Tuesday 11/18 Thursday 11/20 Week 13	<ul style="list-style-type: none"> <li>• Cross-tabulated counts, Part II</li> <li>• Stratified 2-by-2 tables, Part I</li> </ul>	Read textbook chapter 18-19, and do problems in class handouts
Tuesday 11/25 Thursday 11/27 Week 14	<ul style="list-style-type: none"> <li>• Stratified 2-by-2 tables, Part II</li> <li>• No class on 11/27</li> </ul>	Read textbook chapter 19, and do problems in class handouts

Date	Topic	Assignments
Tuesday 12/2 Thursday 12/4 Week 15	<ul style="list-style-type: none"> <li>• Nonparametric tests for medians</li> <li>• Review for categorical data analysis</li> </ul>	Practice problems from class handouts
Tuesday 12/9 Thursday 12/11 Week 16	<ul style="list-style-type: none"> <li>• Introduction to SPSS (In computer lab)</li> <li>• Review for final exam</li> </ul>	Practice problems from class handouts
Tuesday 12/16 Week 17	<ul style="list-style-type: none"> <li>• <b>Final Exam (12/16 from 9:45-11:45am) in room T208</b></li> </ul>	

### Course Policies:

- All students are expected to attend the class and do the assigned homework.
- Plagiarism is unacceptable for all exams and will result in a failing grade for the course, depending on the extent of the violation. Please be familiar with the University of Hawaii Student Conduct Code, available at the Office of Student Affairs at the Student Services Center.
- Final grades are based on the total score. There will be two midterm exams worth 100 points each and a final exam worth 200 points. The final exam is cumulative, but will focus on the contents after the second exam. **All exams are "open-book" and class notes may be used during each exam.** You will need a pocket calculator that can compute means and standard deviations.
- Students need to let the instructor know at least 2 days before each exam if there is a conflict with the scheduled exam. A make-up exam can be scheduled if the student cannot take the exam on scheduled date.
- The course schedule may need to be revised and some topics may be rescheduled depending on the progress of the class.
- Students are encouraged to come during office hours to ask questions.

### Grading Scale for Class Assignments

Grading points	Total Points	Percentage
Exam 1	100	25%
Exam 2	100	25%
Final Exam	200	50%

### Grading Scale – I do not use the “+/-” grading system

A=90-100%	Excellent, distinctive work. Demonstrate sophisticated understanding of the course material and know how to use it in different situations.
B=80-89%	Above average work. Understand most of the statistics concepts and reasoning and can solve most of the problems.
C=67-79%	Average work, sufficient, but not distinctive. Understand basic statistics concepts and reasoning and can use statistical tools to solve basic problems.
D=60-65%	Poor, insufficient work for understanding statistics concepts and reasoning.
F < 60%	Unacceptable work for understanding statistics concepts and reasoning.

## University Policy and Accommodations

### 1. Non-Discrimination

The University is committed to a policy of nondiscrimination on the basis of race, sex, age, religion, color, national origin, ancestry, handicap, marital status, arrest and court record, sexual orientation, and veteran status.

### 2. Accommodations

Any student who may need an accommodation based on the impact of a disability is invited to contact me privately within first weeks of the course. I would be happy to work with you, and the KOKUA Program (Office for Students with Disabilities) to ensure reasonable accommodations in my course. KOKUA can be reached at (808) 956-7511 or (808) 956-7612 (voice/text) in room 013 of the Queen Lili'uokalani Center for Student Services

### MPH Competencies:

As stated in the Student Handbook: "To ensure that students are able to integrate their classroom experiences with the realities of the practice of public health in the field, there are specific competencies to be achieved in the MPH degree program and within their specialization."

By graduation, MPH students must demonstrate ability to apply public health perspectives, knowledge, and skill in the areas of core and cross cutting areas. The table below lists all the cross-cutting competencies and the ones that are addressed in PH 655: Biostatistics I. These are newer competencies being phased in and changed in school year 2008-2009.

<b>BIostatistics Competency (PH 655)</b> Upon graduation, the MPH student will be able to apply basic statistical methods to address, analyze, and solve problems in public health studies.
Criteria to evaluate mastery of this competency:
<ol style="list-style-type: none"><li>1. Describe the roles of biostatistics in the discipline of public health.</li><li>2. Describe the basic biostatistics concepts such as summary statistics, probability, and statistic inference.</li><li>3. Apply exploratory data analysis and descriptive statistics to summarize public health data.</li><li>4. Set up null hypotheses for public health research questions, use corresponding statistics method to test the null hypotheses, and draw conclusions based on the testing results.</li><li>5. Apply common statistics methods to analyze public health data.</li><li>6. Interpret results of statistical analyses found in public health studies.</li><li>7. Compute sample size needed for give power and Type I error rate for basic study designs in public health studies.</li></ol>