

## PubH 6414-online Biostatistical Methods I. Summer 2009

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<b>Credits:</b>	3
<b>Meeting Days:</b>	online
<b>Meeting Time:</b>	online
<b>Meeting Place:</b>	online
<b>Instructor:</b>	Cynthia Davey, MS
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<b>Office Hours:</b>	(online) 9-10 AM Mon, Tues, Wed, Thurs, or by appointment

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### I. Course Description

Biostatistical Methods I is intended to convey the fundamentals, or basics, of biostatistics. It consists of 15 on-line lessons, 11 Excel-based assignments, and textbook readings. This WebCT course was originally developed in 2002 by Chap T. Le, PhD, Distinguished Professor of Biostatistics, University of Minnesota School of Public Health. Lesson slides have been compiled from previous and current instructors of PubH 6414: Chap T. Le PhD, Melanie Wall PhD, Judith Bebchuck PhD, Susan Telke MS, Cynthia Davey MS and Ann Brearley PhD MS.

You should have received a welcome email instructing you where and how to log on to the course. An Orientation to Online Learning is also available to help you learn about WebCT Vista.

### II. Course Prerequisites

#### Basic Mathematics Knowledge

The course presupposes a basic knowledge of mathematics (including algebra). A Math Refresher website has been created to help you review these concepts: (<http://cpheo.sph.umn.edu/cpheo/courses/math.html> ). It is entirely up to you whether you even visit the site. However, it's there to help you feel confident of the basic mathematical operations that may be referred to in the course.

### **Familiarity with Excel**

Experience with computerized spreadsheets such as Excel is recommended, but not required. It is recommended that students with little or no experience using Excel work through this Excel tutorial prior to the first day of class: <http://www.usd.edu/trio/tut/excel/>. You can ignore the functions: COUNTA, IF, PMT, SIN, COS, TAN. All the other information in this tutorial is relevant to exercises and assignments in this course.

If you feel you need a little more practice with Excel than the above tutorial provides, the following tutorial sites are entirely optional but may be useful supplements or reference guides:

<http://phoenix.phys.clemson.edu/tutorials/excel/index.html> (This one is intended for physics students, but parts 1, 2, 3, 7 and 10 should be helpful for biostatistics students.)

<http://homepage.cs.uri.edu/tutorials/csc101/pc/excel97/excel.html>

<http://www.quasar.ualberta.ca/edit202/tutorial/spreadsheet/spreadsheet.htm> (This one is actually a page of links to other Excel tutorials, mostly from other schools.)

Should you have questions about these or other matters, don't hesitate to send an email to the course email account ([pubh6414@umn.edu](mailto:pubh6414@umn.edu)). If you have questions regarding WebCT, contact Jim Harpole, Distance Education Coordinator, at 612-626-5069 or [decsph@umn.edu](mailto:decsph@umn.edu).

### **III. Course Goals and Objectives**

At the conclusion of the course, students will be able to:

1. Recognize fundamentals of biostatistics in health-related fields.
2. Calculate basic descriptive statistics using Excel functions.
3. Use Excel to graphically display data.
4. Have a basic understanding of probability models and how these relate to statistics.
5. Estimate population parameters from sample data and calculate confidence intervals.
6. Understand the principles of hypothesis testing and the correct interpretation of hypothesis test results obtained using Excel.
7. Generate regression analysis and ANOVA summaries using Excel and correctly interpret the results.

### **IV. Methods of Instruction and Work Expectations**

Online lessons (15)

Text readings

Practice Exercises for most lessons

Excel Modules (15)

11 homework assignments using Excel

Students should be aware that the expectations and requirements in this course are no different from the expectations and requirements in a typical lecture course.

## V. Course Text, Readings and Software

Required Textbooks and Software:

**1) Basic and Clinical Biostatistics 4th edition by Beth Dawson and Robert G. Trapp; a Lange Medical book/McGraw Hill, 2004 (ISBN 0-07-141017-1).**

**2) MS Excel with the Data Analysis Tool installed.** You can purchase Excel at a student discount from the University of Minnesota bookstore or through the University Office of Information Technology: <http://www1.umn.edu/oit/utools/licensed/agreement-students/index.htm> .

- Check **NOW** to make sure you have the Data Analysis Tool installed in Excel:
  - Open Excel and Go to 'Tools' on the Toolbar.
  - Select 'Data Analysis' - you should see an 'Analysis Tools' box.
- If you don't see the 'Data Analysis' option under 'Tools', select 'Add-Ins' under 'Tools' and check the box next to 'Analysis ToolPak'.
- If the Data Analysis tool isn't installed and the Analysis ToolPak isn't an Add-In option you may need to re-install your Excel program and select the Data Analysis Tool as an option.

**NOTE TO MAC USERS:** Office 2008 for Mac does not have the Excel Data Analysis Tool. If you are using Office 2008 for Mac, you will need to install an earlier version of Excel (Office 2004) on your Mac so that you'll have access to the Data Analysis Tool.

Supplemental Online Text:

Pocket Dictionary of Statistics by Hadeo Sahai and Anwer Khurshid; McGraw-Hill, 2002 (ISBN 0-072-51693-3). This is available online at <http://www.mhhe.com/business/opsci/bstat/keyterm.mhtml>, no need to purchase.

## VI. Course Outline/Weekly Schedule

<i>Date</i>	<i>Lessons and Assignments</i>	<i>Sections in text</i>
Jun 15	0. Introduction to Course 1. Data collection and Data Types Excel Module: Introduction to Excel 2. Summarizing Numerical Data <ul style="list-style-type: none"> <li>a. Numerical Summaries</li> <li>b. Tables and Graphs</li> </ul> Excel Module 1: Summarizing Numerical Data Excel Module 2: Graphs and Tables for Numerical Data	Jun 15 – Jun 29: Chapter 1. Chapter 2. Chapter 3. Chapter 4 through page 80. Chapter 12 pages 306-309.
Jun 16-17	3. Summarizing Nominal and Ordinal Data <ul style="list-style-type: none"> <li>a. Proportions</li> <li>b. Rates</li> <li>c. Graphs</li> </ul> Excel Module 3: Proportions and Rates, Graphs for Nominal Data	

Jun 18-19	4. Relationships between Two Variables a. Two Numerical Variables b. Two Nominal Characteristics Excel Module 4: Correlation Coefficient, Scatterplots, Ratios	
<b>Tuesday Jun 23</b>	<b>Homework 1 &amp; Homework 2 due by midnight</b>	
Jun 22-23	5. Probability a. Definitions and Rules b. Bayes' Theorem Excel Module 5: Probability	
Jun 24-26	6. Probability Distributions a. Part I: Normal and Standard Normal b. Part II: Binomial, Poisson Excel Module 6: Normal Distribution	
<b>Sunday Jun 28</b>	<b>Homework 3 &amp; Homework 4 due by midnight</b>	
Jun 29	Exam 1 Review Exercises	
<b>Tues June 30 (9 AM) – Thurs July 2 (Midnight)</b>	<b>Exam 1: 2 parts</b> <b>50 pt. multiple choice – 120 minute time limit</b> <b>50 pt. Excel – untimed due by midnight on July 2</b>	
<b>July 3- 5</b>	<b>Fourth of July Holiday</b>	
July 6 - 8	7. Sampling Distributions and the Central Limit Theorem Excel Module 7: Sampling Distribution of the Mean	July 6 – July 16: Chapter 4 page 80 – end. Chapter 5 through page 113.
July 9 - 10	8. Confidence Intervals and Hypothesis Tests of Means from One Group Excel Module 8: Confidence Intervals and Hypothesis Tests of the Mean	
<b>Monday, July 13</b>	<b>Homework 5 &amp; Homework 6 due by midnight</b>	
July 13 - 14	9. Confidence Intervals and Hypothesis Tests of Proportions from One Group Precision and Bias Excel Module 9: Confidence Interval and Hypothesis Tests of a Proportion	
<b>Wednesday July 15</b>	<b>Homework 7 due by midnight</b>	
July 16	Exam 2 Review Exercises	

<p>Fri July 17 (9 am) – Sunday July 19 midnight</p>	<p>Exam 2: 2 parts                      50 pt. multiple choice – 120 minute time limit                      50 pt. Excel – untimed due by midnight on July 19</p>	
<p>July 20 - 21</p>	<p>10. Confidence Intervals and Hypothesis Tests of Means from Paired Data and from Two Groups                      Excel Module 10: Confidence Intervals and Hypothesis Tests of Means from Paired Data and from Two Groups</p>	<p>July 20 – Aug 4:                      Chapter 5 through page 125.                      Chapter 6 through page 154.                      Chapter 7 through page 173.                      Chapter 8 pages 192-194, 198-212.</p>
<p>July 22 – July 24</p>	<p>11. Confidence Intervals and Hypothesis Tests of Proportions from Two Groups                      Excel Module 11: Confidence Interval and Hypothesis Tests of Proportions from Two Groups                      12. Contingency Table Analysis: Chi-square, Fisher’s Exact and McNemar Tests                      Excel Module 12: Chi-square Test and McNemar Chi-square Test</p>	
<p>Monday July 27</p>	<p>Homework 8 &amp; Homework 9 due by midnight</p>	
<p>July 27 – July 28</p>	<p>13. One-Way ANOVA                      Excel Module 13: ANOVA                      14. Confidence Intervals for RR and OR                      Excel Module 14: Confidence Intervals for RR and OR</p>	
<p>July 29 – July 31</p>	<p>15. Simple Linear Regression Analysis                      a. Part I                      b. Part II                      Excel Module 15: Linear Regression                      Suppl. Introduction to PubH 6415 Topics</p>	
<p>Monday Aug 3</p>	<p>Homework 10 &amp; Homework 11 due at midnight</p>	
<p>Aug 3 – Aug 4</p>	<p>Exam 3 Review Exercises</p>	
<p>Wed Aug 5 (9 am) – Friday Aug 7 midnight</p>	<p>Exam 3: 2 parts                      50 pt. multiple choice – 120 minute time limit                      50 pt. Excel – untimed due by midnight on Aug 7</p>	

## VII. Evaluation and Grading

PubH 6414 can only be taken A/F. The S/N option is not available for PubH 6414.

Grading is determined by:

- Best 9 of 11 homework assignments (20%)
- On-line Exam 1 (25%)
- On-line Exam 2 (25%)
- On-line Final Exam (30%)

All exams have two parts: a multiple choice timed exam and an untimed Excel exam. Both parts of each exam are to be completed independently.

Assignments are to be submitted by the due dates and exams are to be completed by the due dates indicated in the course schedule. Assignments submitted 0-24 hours late will lose 1/20 points. Assignments submitted 24-48 hours late will lose 2/20 points. Assignments submitted >48 hours late will not be graded. There are no provisions for make-up exams. Students with a legitimate need to reschedule an exam should contact the instructor as soon as possible.

- A/F letter grade will be determined by total effort as follows:

A = 93-100%	(4.0) Represents achievement that is outstanding relative to the level necessary to meet course requirements.
A- = 90-92%	
B+ = 87-89%	
B = 83-86%	(3.0) Represents achievement that is significantly above the level necessary to meet course requirements.
B- = 80-82%	
C+ = 77-79%	
C = 73-76%	(2.0) Represents achievement that meets the minimum course requirements.
C- = 70-72%	
F =	Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

### Course Evaluation

Beginning in Fall 2008 the SPH will collect student course evaluations electronically using a software system called CoursEval. The system will send email notifications to students when they can access and complete their course evaluations. Students who complete their course evaluations promptly will be able to access their final grades just as soon as the faculty member renders the grade. All students will have access to their final grades two weeks after the last day of the semester regardless of whether they completed their course evaluation or not. Student feedback on course content and faculty teaching skills are important means for improving our work.

Please take the time to complete a course evaluation for each of the courses for which you are registered.

### **Incomplete Contracts**

A grade of incomplete "I" shall be assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., documented illness or hospitalization, death in family, etc.), the student was prevented from completing the work of the course on time. The assignment of an "I" **requires** that a contract be initiated and completed by the student **before** the last day of class, and signed by both the student and instructor. If an incomplete is deemed appropriate by the instructor, the student, in consultation with the instructor, will specify the time and manner in which the student will complete course requirements. Extension for completion of the work will not exceed one year (or earlier if designated by the student's college). For more information and to initiate an incomplete contract, students should go to: [www.sph.umn.edu/grades](http://www.sph.umn.edu/grades).

### **University of Minnesota Uniform Grading and Transcript Policy**

A link to the policy can be found at [onestop.umn.edu](http://onestop.umn.edu).

## **VIII. Other Course Information and Policies**

### **Course Withdrawal**

Students should refer to the Refund and Drop/Add Deadlines for the particular term at [onestop.umn.edu](http://onestop.umn.edu) for information and deadlines for withdrawing from a course. As a courtesy, students should notify their instructor and, if applicable, advisor of their intent to withdraw.

Students wishing to withdraw from a course after the noted final deadline for a particular term must contact the School of Public Health Student Services Center at [sph-ssc@umn.edu](mailto:sph-ssc@umn.edu) for further information.

### **Student Conduct, Scholastic Dishonesty and Sexual Harassment Policies**

Students are responsible for knowing the University of Minnesota, Board of Regents' policy on Student Conduct and Sexual Harassment found at [www.umn.edu/regents/polindex.html](http://www.umn.edu/regents/polindex.html).

Students are responsible for maintaining scholastic honesty in their work at all times. Students engaged in scholastic dishonesty will be penalized, and offenses will be reported to the Office of Student Academic Integrity (OSAI, [www.osai.umn.edu](http://www.osai.umn.edu)).

The University's Student Conduct Code defines scholastic dishonesty as "plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis."

Plagiarism is an important element of this policy. It is defined as the presentation of another's writing or ideas as your own. Serious, intentional plagiarism will result in a grade of "F" or "N" for the entire course. For more information on this policy and for a helpful discussion of preventing plagiarism, please consult University policies and procedures regarding academic integrity: <http://writing.umn.edu/tww/plagiarism/>.

Students are urged to be careful that they properly attribute and cite others' work in their own writing. For guidelines for correctly citing sources, go to <http://tutorial.lib.umn.edu/> and click on "Citing Sources".

In addition, original work is expected in this course. It is unacceptable to hand in assignments for this course for which you receive credit in another course unless by prior agreement with the instructor. Building on a line of work begun in another course or leading to a thesis, dissertation, or final project is acceptable.

**Disability Statement**

It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have a documented disability (e.g., physical, learning, psychiatric, vision, hearing, or systemic) that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact Disability Services to have a confidential discussion of their individual needs for accommodations. Disability Services is located in Suite 180 McNamara Alumni Center, 200 Oak Street. Staff can be reached by calling 612/626-1333 (voice or TTY).