

UNIVERSITY OF MASSACHUSETTS
Department of Public Health
Program in Biostatistics and Epidemiology

PUBHLTH 540W - Introductory Biostatistics
Fall 2007

<http://www-unix.oit.umass.edu/~biep540w>

Instructor:

Carol Bigelow, PhD
School of Public Health
402 Arnold House
University of Massachusetts
Amherst, MA 01003
tel: 413/545-1319
email: cbigelow@schoolph.umass.edu

Text:

Rosner, B. Fundamentals of Biostatistics, Sixth Edition, 2005
Duxbury Press.
ISBN 0-534-418201 (Hardcover)

Office Hours:

4:00-5:00 Mondays, in the hospital cafeteria, or, by appointment.

This course has 9 units

1. Summarizing Data
 2. Introduction to Probability
 3. Populations and Samples
 4. The Bernoulli and Binomial Distributions
 5. The Normal Distribution
 6. Estimation
 7. Hypothesis Testing
 8. Chi Square Tests
 9. Regression and Correlation
-

For each unit, the following are provided

- Lecture Notes
 - Practice Problems with Solutions (UNGRADED)
 - Computer Illustration(s)
 - Additional Resources
 - Readings
 - Other Links of Interest
-

Grading Policy:

Course grades will be determined by three examinations

Examination I – 33%

1. Summarizing Data
2. Introduction to Probability
3. Populations and Samples

Examination II – 33%

4. The Bernoulli and Binomial Distributions
5. The Normal Distribution

Examination III – 33%

6. Estimation
7. Hypothesis Testing
8. Chi Square Tests

Exam Schedule:

Examination I – 33%

Posting - **October 15, 2007**

Due - **October 29, 2007**

Examination II – 33%

Posting – **November 19, 2007**

Due - **December 3, 2007**

Examination III – 33%

Posting - **December 7, 2007**

Due - **December 21, 2007**

Note – As we are a very large class, unfortunately, I will not be able to accommodate requests for different exam schedules, either posting or due dates. Thank you. .

There is no policy on attendance.

Important Dates to Remember

- First Class – Monday September 10
 - Last Day to Drop with no record – Monday September 17
 - Holiday, Columbus Day – Monday October 8
 - Monday Class will be held on Tuesday – Tuesday October 9
 - Last Day to Drop with “DR” – Monday October 15
 - Last Class – Monday December 10
 - Take Home Final Exam Due – Friday December 21
-

Calendar

1. Monday September 10, 2007

2. Monday September 17, 2007

Course Introduction

Unit 1 - Summarizing Data

- scales of measurement
- descriptive measures for nominal and ordinal data
- descriptive measures for interval and ratio data
- other graphical techniques
- the summation notation
- measures of central tendency
- measures of dispersion

3. Monday September 24, 2007

4. Monday October 1, 2007

Unit 2. Introduction to Probability

- events
- probability distribution
- types of events
- how to calculate probabilities
- sensitivity, specificity
- predictive value positive, negative
- risk, odds
- relative risk, odds ratio

5. Tuesday October 9, 2007

Unit 3. Populations and Samples

- populations versus samples
- unbiased sampling plan
- non-probability sampling plans
- probability sampling plans

6. Monday October 15, 2007

Unit 4. Bernoulli and Binomial Distributions

- bernoulli trials
- combinatorials
- binomial distribution
- how to calculate binomial probabilities

7. Monday October 22, 2007

8. Monday October 29, 2007

Unit 5. Normal Distribution

- probabilities for continuous variables
- a feeling for the normal distribution
- a feeling for the central limit theorem
- how to use the normal(0,1) tables
- how to calculate normal probabilities

9. Monday November 5, 2007

10. Monday November 12, 2007

Unit 6. Estimation

- definitions and notation
- criteria for a good estimator
- mean of normal when variance is known
- introduction to the Student t distribution
- mean of normal when variance is unknown
- introduction to the chi square distribution
- variance of normal
- introduction to sums of independent normals
- estimation for sums and differences of normals
- introduction to the F distribution
- comparison of two normal variance parameters
- estimation for paired normal data

11. Monday November 19, 2007

12. Monday November 26, 2007

Unit 7. Hypothesis Testing

- the logic of significance testing
- p-values, type I and II error, power
- decision rules and critical values
- summary of procedure for hypothesis testing
- test of mean of normal, variance known
- test of mean of normal, variance unknown
- test of variance of normal
- review of sums and differences of normals
- test of equality of two normal variances
- test of equality of two means, variances known
- estimation of pooled variance
- test of equality of two means, variances unknown (equal)
- test of equality of two means, variances unknown (unequal)
- large sample result for the binomial distribution
- estimation and hypothesis testing

13. Monday December 3, 2007**Unit 8. Chi Square Tests**

- examples of categorical data
- relationship between the normal and chi square distribution
- the chi square test
- the continuity correction

14. Monday December 10, 2007**Unit 9. Correlation and Regression**

- correlation
 - regression
 - the least squares regression line
 - the pearson correlation coefficient
-

Policy on Academic Dishonesty:

The University of Massachusetts/Amherst Senate Document 89-026 defines academic dishonesty as including but not limited to:

- a) Cheating – intentional deceit, trickery, or breach of confidence, used to gain some unfair or dishonest advantage in one's academic work.
- b) Fabrication – intentional falsification or invention of any information or citation in any academic exercise.
- c) Facilitating dishonesty – knowingly helping or attempting to help someone else commit an act of academic dishonesty.
- d) Plagiarism – knowingly representing the words or ideas of another as one's own work in any academic exercise.
- e) Submitting in whole or in part, without citation, prewritten term papers of another or the research of another (including but not limited to such materials sold or distributed commercially).