

Course Title: Introduction to Biostatistics

Course Number: PHCO 0504J 001Fall 2016

Course Location: MSB

Course Date & Time: Thurs 5:30-8:30, with the exception of Tuesday, Nov 22 replacing a class on Thursday, Nov 24 (Thanksgiving Day)

Course Instructor: Amy Davidow, Ph.D. Associate Professor
davidoal@sph.rutgers.edu tel: 973-972-4587

Course Assistant: Cathleen Xing, M.S.
cyxi@scarletmail.rutgers.edu

Office Hours: Dr. Davidow: by appointment only
 Ms. Xing:

Required Course Text: *Principles of Biostatistics*, 2nd edition, by Pagano and Gauvreau, Duxbury Press, 2000.

Additional/Supplemental Readings/Resources: *Fundamentals of Biostatistics*, 7th by Rosner, Duxbury Press, 2010.

Statistical Software: SPSS is available on computers AST/Academic Computing Laboratory MSB C level. You can also purchase a 6 month license for Windows from <https://estore.onthehub.com>

Calculator: We will be doing some calculations that require a scientific calculator. Please verify the calculator is a scientific calculator, i.e., it can do logs and exponentials, and knows the order of operations. Bring your calculator to class to perform class exercises.

Moodle: All lecture notes, data sets, computing exercises, and homework assignments will be uploaded on Moodle.

Course Description: Introduction to Biostatistics presents an introduction to the important, and fundamental, concepts in statistics and probability as they relate to biomedical and public health scientific research and data analysis. Topics include: data types; basic probability; estimation of the mean and variance of a sample; hypothesis testing on a single sample, and two or more samples; analysis of categorical data; power and sample size; and regression analyses.

Competencies Addressed: The competencies addressed in this course include:

- Describe the roles biostatistics serves in the discipline of public health.
- Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.
- Apply descriptive techniques commonly used to summarize public health data

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- Describe basic concepts of probability, random variation and commonly used statistical probability distributions.
- Apply common statistical methods for inference.
- Describe preferred methodological alternatives to commonly used statistical methods when assumptions are not met.
- Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.
- Interpret results of statistical analyses found in public health studies.
- Use statistical software to manage data and perform analyses.

Course Objectives: By the completion of this course, students will be able to:

- Understand the difference between types of data
- Understand the basics of probability
- Summarize data
- Test statistical hypotheses under the classical framework
- Read and critically evaluate the analytic methods used in biomedical journal articles

Course Requirements and Grading:

- **Homework:** Doing homework is fundamental to learning. Discussion of approaches to answering questions and checking answers among students is encouraged, but all work submitted should be your own. Assignments are due on the stated due date via Moodle by 11:59 PM. No late homework assignments will be accepted unless previously agreed upon with the instructor.
- **Quizzes/Exams:** Quizzes and exams will be open book and open note, and will require a calculator. Purpose of the quizzes is to demonstrate proficiency on the most recent topics covered in previous classes. They will be approximately 20 minutes in length at the beginning of class. Exams will generally take 1.5 hours, or half the class period. Students should expect to have lecture after quizzes and exams.

- **Course Grading:**

1. Homework	25% (5% each, lowest grade dropped)
2. Computer Exercises	15%
3. Quizzes (3)	15% (5% each)
4. Exam 1	20%
5. <u>Exam 2 (Final)</u>	<u>25%</u>

Total: 100%

Course Schedule:

Date	Lecture Topic	Chapters	Computing Due	Homework Due
9/8/2016	Introduction Data types and data presentation	1, 2		
9/15/2016	Numerical summary measures Intro to probability	3, 6.1-6.2	Exercise 1	
9/22/2016	Bayes' theorem, diagnostic tests, relative risk and odds ratio	6.3-6.5		Homework 1
9/29/2016	Quiz 1 Discrete probability distributions: Bernoulli, Binomial, and Poisson	7.1-7.3	Exercise 2	
10/6/2016	Normal Distribution, Sampling Distribution of Mean	7.4-7.6, 8		Homework 2
10/13/2016	Quiz 2 Estimation of the mean	9.1, 9.3	Exercise 3	
10/20/2016	Hypothesis testing Power and sample sizes	10		Homework 3
10/27/2016	Comparison of two means Exam 1	11	Exercise 4	
11/3/2016	ANOVA Nonparametric methods	12, 13		Homework 4
11/10/2016	Inference on proportions	14	Exercise 5	
11/17/2016	Inference on proportions, Contingency tables,	14, 15		Homework 5
11/22/2016 TUESDAY	Quiz 3 Correlation Simple linear regression	17, 18	Exercise 6	
12/1/2016	Multiple linear regression	19		Homework 6
12/8/2016	Last class; catch-up.		Exercise 7	
12/22/2016	FINAL EXAMINATION			

School of Public Health Honor Code: The School of Public Health Honor Code is found in the student bulletin (sph.rutgers.edu/academics/catalog/index.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to

the academic integrity of the school community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems:

When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.