

BIOST 2041: Introduction to Statistical Methods 1

Graduate School of Public Health

Mondays & Wednesdays 4:00 – 5:25 pm, Public Health G23

Fall 2018

Instructor	Email	Office Location & Hours
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Teaching Assistants	Email	Office Location & Hours
TBD		
TBD		
TBD		

Textbooks

Required: *Biostatistics for the Biological and Health Sciences, 2nd edition* (ISBN: 978-0-13-403901-5)

Recommended: *Data Analysis with Stata* (ISBN: 978-1-78217-317-5)

This text can be read online through the University of Pittsburgh library (library.pitt.edu)

Software

Stata (version 15.0 SE)

Please download Stata through the Software Download Service (software.pitt.edu)

Equipment

You will be allowed the use of a calculator for in-class exams. This cannot be your cell phone or computer. It is strongly recommended to use the same calculator for homework as you will on the exams.

Recitation

Mondays 5:30 – 6:25 pm, Public Health G23

In recitation, you have the opportunity to ask questions, get clarification on material presented in class, do extra practice problems, and go over past homework and quizzes. The first recitation will be Monday, September 10th. There is no recitation on Monday, November 26th.

Course Website

Course materials will be distributed through CourseWeb (courseweb.pitt.edu). The CourseWeb announcement mechanism will be used to send messages about class. Only in the event of a time-dependent event (e.g., class canceled due to weather), will an email be sent out to the class. Course-related email will be sent to your “pitt.edu” address only.

Course Prerequisites, Description, and Goals

BIOST 2041 is an introductory applied biostatistics course for public health students and health career professionals who will make use of statistical methods in research projects or in interpreting literature. This class is for students needing a more research-oriented approach than that provided in BIOST 2011

(Principles of Statistical Reasoning) and not requiring the level of mathematical detail that is provided in BIOS 2039 (Biostatistical Methods). The prerequisite is college level algebra.

The overall purpose of this course is to introduce students to basic probability and one and two sample procedures (point and interval estimation and hypothesis testing) for continuous and discrete distributions. Basic one and two sample nonparametric tests are also presented. An introduction to simple linear regression and one and two-way ANOVA are also included. This broad goal includes use of statistical software to analyze data sets and answer research questions; recognition of situations when these procedures are and are not appropriate; and intuitive understanding of the rationale used in creating the statistical procedures presented.

Course Learning Objectives/Competencies

At the conclusion of this course, a student should be able to:

1. Select quantitative data collection methods appropriate for a given public health context (CEPH Evidence-based Approaches to Public Health Competency #2).
2. Describe basic concepts of probability, random variation, and commonly used statistical probability distributions.
3. Describe preferred methodological alternatives to commonly used statistical procedures when assumptions are not met.
4. Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.
5. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate (CEPH Evidence-based Approaches to Public Health Competency #3). To include:
 - A. Apply descriptive techniques commonly used to summarize public health data.
 - B. Apply common statistical methods for inference.
 - C. Apply basic regression methodology.
 - D. Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.
6. Interpret results of data analysis for public health research, policy or practice (CEPH Evidence-based Approaches to Public Health Competency #4).

Course Policies

1. Academic Integrity

All work submitted on homework, quizzes, and exams must be your own. For homework, you are encouraged to work together to solve problems. When you write the assignment, however, you must do any necessary computer work and write the answers yourself. This policy exists for two reasons: (1) Your grade should represent your own work, (2) You should be able to write up the major features of an analysis and doing so on your own for homework is a good way to get more comfortable with this process. Violation of this policy will make you subject to disciplinary action (including dismissal) by Pitt Public Health.

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, approved by EPCC on 10/14/08, which is based on the University policy, is available online (www.publichealth.pitt.edu/academic-handbook). These guidelines are based on the University policy (www.provost.pitt.edu/faculty/academic-integrity-freedom/academic-integrity-guidelines).

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 Pitt Public Health.

All student violations of academic integrity must be documented by the appropriate faculty member; this documentation will be kept in a confidential student file maintained by the Pitt Public Health Office of Student Affairs. If a sanction for a violation is agreed upon by the student and instructor, the record of this agreement will be expunged from the student file upon the student's graduation. If the case is referred to the GSPH Academic Integrity Hearing Board, a record will remain in the student's permanent file.

2. Classroom Decorum

Be respectful of your fellow students, teaching assistants, and instructor. This includes being on time to class and working only on class-related activities while in class. Classroom discussion should be civilized and respectful to everyone and relevant to the topic we are discussing.

3. Disability Services

If you have a disability for which you are requesting an accommodation, please notify the instructor and Disability Resources and Services (www.studentaffairs.pitt.edu/drs/) no later than the second week of term. DRS will verify your disability and determine reasonable accommodations for this course.

4. Classroom Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Grading Scale

Course grades will be assigned based on the following minimal scale. Note that this is a minimal scale and, in certain circumstances, grades can be curved up.

[97%, 100%)	A+	[93%, 97%)	A	[90%, 93%)	A-
[87%, 90%)	B+	[83%, 87%)	B	[80%, 83%)	B-
[77%, 80%)	C+	[73%, 77%)	C	[70%, 73%)	C-
[67%, 70%)	D+	[63%, 67%)	D	[60%, 63%)	D-
[0, 60%)	F				

Student Performance Evaluation

Course grades are based on your performance on:

Exams (60%)

You will take three in-class exams, each worth 20% of the overall grade. Exams are closed book and closed note, except for one sheet of 8.5" × 11" (both sides) of your own notes. These notes cannot include example questions from homework or quizzes. You will turn in your notesheet with your exam. You should bring a calculator not on your cell phone. The use of computers, cell phones, or other internet-attached devices will NOT be permitted during exams. The exams may consist of true/false, multiple choice, and short answer questions. Exams will cover material presented in class, recitation, and through Courseweb, as well as the assigned textbook readings, homework assignments, case studies, and quizzes.

The exams will be during the regular class time in the regular classroom. Tentative dates for the exams are:

Exam #1 – Monday, October 1st

Exam #2 – Monday, November 5th

Exam #3 – Wednesday, December 12th

These exams cannot be taken early or late without a compelling reason and supporting documentation. Students who cannot be present on the day of an exam will be required to take the exam on the first earlier available date. Notification must be given to the instructor in advance.

Homework (30%)

There will be 7 homework assignments, which will be graded for both accuracy and completion. Homework assignments are to be submitted through CourseWeb by the due date, unless otherwise stated. No credit will be given for late assignments. Note: only your top 6 scores will count toward your grade.

Case Studies (10%)

You will work in assigned teams of 3-4 students to complete the case study assignments. There will be 4 case study assignments on CourseWeb through the semester. You will be graded both from a rubric on the submitted assignment and by your other team members' assessments of your work. Case study assignments are to be submitted by one member of the group through CourseWeb by the due date. No credit will be given for late assignments.

Quizzes (0%)

Weekly quizzes will be available via Courseweb. Quizzes will not count toward your overall grade, but a portion of the questions that appear in the quizzes will be on the exams. You should use the quizzes to identify knowledge gaps and areas for improvement throughout the semester.

Course Calendar

Day	Date	Textbook Reading	Assignments	Class Session/Topic	Learning Objectives
M	8/27/18	1		Introduction	1, 4, 5 (A)
W	8/29/18	2 & 3	HW 1 assigned	Data Visualization and Exploration	1, 4, 5 (A)
M	9/3/18			<i>no class (Labor Day)</i>	
W	9/5/18	4.1 - 4.3	HW 1 due Case Study 1 assigned	Probability a) Basic Concepts of Probability b) Probability Rules c) Complementary outcomes	2, 5 (A), 6
M	9/10/18	4.4 - 4.6		Probability d) Applications: Risks, Odds, Rates, Screening e) Counting	2, 5 (A), 6
W	9/12/18	5.1 - 5.2	Case Study 1 due HW 2 assigned	Discrete Probability Distributions	2, 4, 5 (A), 6
M	9/17/18	6.1 - 6.3		Normal Probability Distributions	2, 4, 5 (A), 6
W	9/19/18	6.4 - 6.6	HW 2 due HW 3 assigned	Normal Probability Distributions	2, 4, 5 (A), 6
M	9/24/18	7		Estimating Parameters And Determining Sample Sizes	2, 3, 4, 5 (A,D), 6
W	9/26/18	1, 2, 3, 4, 5, 6, 7	HW 3 due	Review	
M	10/1/18			Exam	
W	10/3/18	8.1 - 8.2	Case Study 2 assigned	Hypothesis Testing a) Basics of Hypothesis Testing b) Testing a Claim About a Proportion	5 (B,D), 6
M	10/8/18	8.3 - 8.4	HW 4 assigned	Hypothesis Testing c) Testing a Claim About a Mean d) Testing a Claim About a Variance	5 (B,D), 6
W	10/10/18	9.1 - 9.2	Case Study 2 due	Inferences from Two Samples a) Two Proportions b) Two Means: Independent Samples	3, 5 (B,D), 6
M	10/15/18			<i>no class (Fall Break)</i>	
T*	10/16/18	9.3 - 9.4	HW 4 due Case Study 3 assigned	Inferences from Two Samples c) Two Dependent Samples (Matched Pairs) d) Two Variances or Standard Deviations	3, 5 (B,D), 6
W	10/17/18	12.1		One-Way ANOVA	5 (B,D), 6
M	10/22/18	12.2	HW 5 assigned	Two-Way ANOVA	5 (B,D), 6
W	10/24/18	11.1		Goodness-of-fit	3, 4, 5 (A,B), 6
M	10/29/18	11.2	HW 5 due	Contingency Tables	3, 4, 5 (A,B), 6
W	10/31/18	8,9,11,12	Case Study 3 due	Review	
M	11/5/18			Exam	

Day	Date	Textbook Reading	Assignments	Class Session/Topic	Learning Objectives
W	11/7/18	10.1		Correlation	4, 5 (A,B,C,D), 6
M	11/12/18	10.2	HW 6 assigned	Regression	4, 5 (A,B,C,D), 6
W	11/14/18	10.3	Case Study 4 assigned	Prediction Intervals and Variation	4, 5 (A,B,C,D), 6
M	11/19/18	10.4	HW 6 due	Multiple Regression	4, 5 (A,B,C,D), 6
W	11/21/18			<i>no class (Thanksgiving Break)</i>	
M	11/26/18	10.5		Logistic Regression	4, 5 (A,B,C,D), 6
W	11/28/18	10.5		Logistic Regression	4, 5 (A,B,C,D), 6
M	12/3/18	13	HW 7 assigned	Nonparametric Tests	2, 3, 5 (B), 6
W	12/5/18	14	Case Study 4 due	Survival Analysis	4, 5 (B,D), 6
M	12/10/18	10, 11, 13, 14	HW 7 due	Review	
W	12/12/18			Exam	

* Monday classes normally scheduled to meet Monday, October 15th will meet on Tuesday, October 16th. Tuesday classes will not meet this week.