

# BIOST 2041: Introduction to Statistical Methods

Graduate School of Public Health

Fall 2020

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## Flex@Pitt Course Model

Participation in this course will be 100% remote. This course will be comprised of asynchronous didactic material and synchronous problem-solving sessions. All problem-solving sessions will take place through Zoom.

## Problem-solving sessions

*Wednesdays, 4:30 – 5:15 pm, 5:30 – 6:15 pm, or 6:30 – 7:15 pm*

Each student should attend their scheduled problem-solving session per week. These sessions will be hands-on practice with example problems with feedback from the instructor and TAs. They are designed for active participation, not observation. Learning statistics is similar to learning a new language – it is done over time and with lots of practice! Review the didactic material prior to your problem-solving session and be prepared to actively engage with the course material during the synchronous sessions. Reviewing course notes will *not* be sufficient to learn the material for this course. Thus, your participation in this class is strongly encouraged.

## Textbooks

The course materials distributed through Canvas will be sufficient. However, if you prefer to have a reference text, this course follows the notation of:

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

For extra help with analysis software consider reviewing:

- *Data Analysis with Stata* (ISBN: 978-1-78217-317-5)
- *Biostatistics with R* (ISBN: 978-1-4614-1301-1)

These texts can be read online for free through the University of Pittsburgh library ([library.pitt.edu](https://library.pitt.edu))

## Software

Students will be permitted to work with either Stata or R in the course. All instruction will be provided for Stata. A set of limited notes will be additionally provided for students who are already familiar with R or who want to learn R independently. It is strongly encouraged that students work exclusively in one software for the semester. For students with no prior programming experience, Stata is strongly recommended.

### *Stata (version 16 SE)*

- Download Stata through the Software Download Service ([software.pitt.edu](https://software.pitt.edu))

### *R version 4.0 and RStudio*

- Download [R](#) and then [RStudio](#)

### Course Website (Canvas)

Course materials will be distributed and turned in through course website ([canvas.pitt.edu](https://canvas.pitt.edu)), which you can access by logging in with your Pitt user ID and password. Any announcements will be distributed through Canvas, so please make sure to update your notification preferences. If you need help logging in to Canvas, call the University Help Desk at 412-624-HELP [4357]. If you experience any issues using Canvas, you can click the Help button within Canvas, which includes 24/7 chat or telephone support. You may also find the following resources helpful in navigating Canvas:

[Canvas Getting Started Guide](#)

[Canvas Student Tour Videos](#)

### 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 BIOST 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

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.
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. 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.

## Course Competencies

### CEPH MPH Competencies

- #2. Select quantitative data collection methods appropriate for a given public health context.
- #3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate.
- #4. Interpret results of data analysis for public health research, policy or practice.

### CEPH DrPH Competencies

- #1. Explain quantitative methods and policy analysis research and evaluation methods to address health issues at multiple (individual, group, organization, community and population) levels

## Course Organization

The material for this course has been broken down into 10 modules, each with a dedicated topic and set of assessments. You can find a brief description of each module here:

Module #	Description	Assessments	Course Objectives	Due Date
M0	Course structure and organization	Quiz, DB		Tue, Aug 25, 2020
M1	Basic principles	Quiz, DB	1, 6	Tue, Sept 1, 2020
M2	Descriptive statistics	Quiz, DA, DB	5A, 6	Tue, Sept 8, 2020
M3	Probability	Quiz, DB	2, 5A, 6	Tue, Sept 15, 2020
M4	One-sample proportions and means	Quiz, DA, DB	1, 4, 5B, 5D, 6	Tue, Sept 29, 2020
M5	Contingency tables	Quiz, DA, DB	1, 3, 4, 5B, 5D, 6	Tue, Oct 6, 2020
M6	Two-sample means	Quiz, DA, DB	1, 4, 5B, 5D, 6	Tue, Oct 20, 2020
M7	Nonparametrics	Quiz, DA, DB	1, 3, 4, 5B, 5D, 6	Tue, Oct 27, 2020
M8	One- and two-way ANOVA	Quiz, DA, DB	1, 4, 5B, 5D, 6	Tue, Nov 10, 2020
M9	Linear regression and survival analysis	Quiz, DA, DB	1, 4, 5B, 5C, 5D, 6	Tue, Nov 24, 2020
M10	Putting it all together	Quiz, DA, DB	1, 3, 4, 5A, 5B, 5C, 5D, 6	Tue, Dec 1, 2020

## Student Performance Evaluation

Students will be evaluated based on their performance in the following assessments. All assessments will be graded on a pass/no pass basis.

### Quizzes

Quizzes should be taken in Canvas by 11:59pm on the due date. Quizzes are open note, open internet, but you must work independently. You are forbidden from working with any other person on quizzes. Quizzes will be multiple choice questions, will cover material presented in the respective module, and will have an emphasis on conceptual questions. To pass a quiz, a student must earn a score of 80% or better.

If you do not pass the quiz on the first attempt, you will need to correct the quiz. **UPDATED 8/31/2020: The quiz correction assignment will be opened in Canvas on the Wednesday after the quiz due date to those students who need to provide corrections. All students needing to provide corrections will have until Friday to do so (regardless of when you took the quiz initially). Revisions must be submitted within 3 days after the assignment has been graded.** In order to correct a quiz students must, for each incorrect answer you must write a detailed explanation of why the chosen answer was incorrect and why the correct answer is correct. Students are permitted to confer with classmates on quiz corrections, as long as the work they submit is entirely their own, and are welcome to ask questions about them

during TA or instructor office hours. Submitting a quiz correction does not guarantee a pass; submissions will be evaluated to ensure that the student has demonstrated sufficient understanding of the material to warrant a pass.

These quizzes cannot be taken late without a compelling reason and supporting documentation. Contact Dr. Carlson for help with this. Students with disability accommodations are encouraged to work with the Testing Center to schedule quizzes (<http://www.studentaffairs.pitt.edu/drs/>).

### **Discussion Board Posts (DB)**

Discussion board prompts will be posted for each module. (Prompts will vary throughout the semester and specific instructions will be given in the prompts.) You must thoughtfully respond to the prompt AND respond to at least one classmate. Your initial post should be completed by 11:59pm on the Sunday night before the module due date. The response to at least one classmate's post should be completed by 11:59pm on the module due date. These posts will be graded using the discussion board rubric (available in Canvas).

Students not passing a DB assignment must revise their initial post and reply. Revisions must be submitted within 3 days after the assignment has been graded. Students are permitted to confer with classmates on assignment revisions, as long as the work they submit is entirely their own, and are welcome to ask questions about them during TA or instructor office hours. Submitting a revision for an assignment does not guarantee a pass; revisions will be evaluated using the same rubric to ensure that the student has demonstrated sufficient understanding of the material to warrant a pass.

### **Data Analysis Assignments (DA)**

For a data analysis assignment you must select the appropriate statistical method to use and perform analysis in Stata or R. These assignments will be graded for both accuracy and completion using the data analysis assignment rubric (available in Canvas). Data analysis assignments are to be submitted through Canvas prior to 11:59pm on the corresponding module due date. Students are permitted to work with classmates on data analysis assignments, as long as the work they submit is entirely their own.

Students not passing a DA assignment must revise the assignment. Assignment revisions must be submitted within 3 days after the assignment has been graded. Students are permitted to confer with classmates on assignment revisions, as long as the work they submit is entirely their own, and are welcome to ask questions about them during TA or instructor office hours. Submitting a revision for an assignment does not guarantee a pass; revisions will be evaluated using the same rubric to ensure that the student has demonstrated sufficient understanding of the material to warrant a pass.

### **Working Outside of the Schedule**

Module materials including assignments will be posted as soon as they are available, so you may be able to work ahead if you need to. Sometimes, I mistakenly forgot to "publish" something on the Canvas page to make it visible to you, so if you think you should have access to something that isn't available, please send me a message.

If something comes up (e.g. you fall ill or need to care for someone in your household you is ill), please email me ASAP. We can work out a timeframe for completing the coursework based on your specific situation. I will try my best to be accommodating, but please do not take advantage of this. Working outside the preset course schedule creates extra work for me and the TAs and limits our availability to other students. Also, please note that I do not consider planned trips (vacations, conferences, etc.) to justify accommodations in the assignment due dates.

### **Late work policy**

Late work is NOT accepted without prior approval (before the due date) from Dr. Carlson. Extensions on assignment deadlines may be granted for unforeseen, extenuating circumstances (family emergencies, severe illness, etc.).

### **Grading Scale**

The grade system of this course is designed to reflect each student's mastery of the learning objectives. Thus, students will be graded using the following terms:

- To earn a C- in the course, a student must successfully complete all assessments for modules 1-5
- To earn a C in the course, a student must successfully complete all assessments for modules 1-6
- To earn a B- in the course, a student must successfully complete all assessments for modules 1-7
- To earn a B in the course, a student must successfully complete all assessments for modules 1-8
- To earn an A- in the course, a student must successfully complete all assessments for modules 1-9
- To earn an A in the course, a student must successfully complete all assessments for modules 1-10
- To earn an A+ in the course, a student must successfully complete all assessments for modules 1-10 without needing to revise/correct any assignments.

Any student not successfully completing all assessments for the first five modules at a satisfactory level will receive an F.

### Grading concerns

Students have 24 hours after graded work is returned to request a regrade. These requests must be emailed to Dr. Carlson and include an explanation for why the regrade is necessary. Please note: a regrade means the entire assessment will be graded again which may result in a lower grade.

### Academic Integrity

All students are expected to adhere to the school's standards of academic honesty. Cheating/plagiarism will not be tolerated. The Graduate School of Public Health's policy on academic integrity, which is based on the University policy, is available online in the Pitt Public Health Academic Handbook [www.publichealth.pitt.edu/home/academics/academic-requirements](http://www.publichealth.pitt.edu/home/academics/academic-requirements). The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

### Diversity

The University of Pittsburgh Graduate School of Public Health considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. Pitt Public Health is committed to creating and fostering inclusive learning environments that value human dignity and equity. Every member of our community is expected to be respectful of the individual perspectives, experiences, behaviors, worldviews, and backgrounds of others. While intellectual disagreement may be constructive, no derogatory statements, or demeaning or discriminatory behavior will be permitted.

If you feel uncomfortable or would like to discuss a situation, please contact any of the following:

- the course director or course instructor;
- the [Pitt Public Health Associate Dean for Diversity and Inclusion](#);
- the University's Office of Diversity and Inclusion at 412-648-7860 or <https://www.diversity.pitt.edu/civil-rights-title-ix-compliance/make-report/report-form> (anonymous reporting form)

### Sexual Misconduct, Required Reporting, and Title IX

The University is committed to combatting sexual misconduct. As a result, you should know that University faculty and staff members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the University's Title IX office so that the victim may be provided appropriate resources and support options. What this means is that as your professor, I am required to report any incidents of sexual misconduct that are directly reported to me, or of which I am somehow made aware.

There are two important exceptions to this requirement about which you should be aware: A list of the designated University employees who, as counselors and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <https://www.diversity.pitt.edu/civil-rights-title-ix-compliance/make-report/confidentiality-and-retaliation>

An important exception to the reporting requirement exists for academic work. Disclosures about sexual misconduct that are shared as part of an academic project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX office.

If you are the victim of sexual misconduct, Pitt encourages you to reach out to these resources:

- Title IX Office: 412-648-7860
- SHARE @ the University Counseling Center: 412-648-7930 (8:30 A.M. TO 5 P.M. M-F) and 412-648-7856 (AFTER BUSINESS HOURS)

If you have a safety concern, please contact the University of Pittsburgh Police, 412-624-2121.

Other reporting information is available here: <https://www.diversity.pitt.edu/civil-rights-title-ixcompliance/make-report>

Statement from the Department of Gender, Sexuality, and Women's Studies

[This statement was developed by Katie Pope, Associate Vice Chancellor for Civil Rights and Title IX, in conjunction with GSWS instructors.]

### 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/](http://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.

### COVID-19 Statement

In the midst of this pandemic, it is extremely important that you abide by public health regulations and University of Pittsburgh health standards and guidelines. While in class, at a minimum, this means you must wear a face covering and comply with physical distancing requirements; other requirements may be added by the University during the semester. These rules have been developed to protect the health and safety of all community members. Failure to comply with these requirements will result in you not being permitted to attend class in person and could result in a Student Conduct violation. For the most up-to-date information and guidance, please visit [coronavirus.pitt.edu](http://coronavirus.pitt.edu) and check your Pitt email for updates before each class.