PUBHBIO 7230 – Applied Longitudinal Data Analysis
3 credits – Spring 2026
Asynchronous, with a single 1-hour synchronous Q&A session in the final exam week (April 29 to May 4, 2026)

Course Instructor
Instructor: Fernanda Lang Schumacher
Degree information: PhD in Statistics, University of Campinas, 2021
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Instructor's Office Hours
Thursday, 11:30 AM to 12:30 PM or by appointment, online

Communication
- **CarmenCanvas**: All official announcements, grade-related inquiries, personal issues, and formal assignment submissions will take place on Carmen.
- **Discord** (optional but highly recommended): For technical questions, R/Stata debugging, and peer collaboration, we will use a course Discord server. This acts as our "Digital Lab Bench." It allows for faster, more collaborative troubleshooting than email.

Faculty Feedback & Response Time
The following gives you an idea of my intended availability during the course:
- **Grading:** You can generally expect feedback within 7 days.
- **Carmen/email:** I will generally reply to e-mails (sent via Carmen) within one business day.
- **Discord/discussion board:** Either the TA or the instructor will generally check and reply to messages in the discussion boards within one business day. Peer-to-peer help is encouraged and often faster!

Graduate Teaching Assistant (GTA)
Jeongjin Lee
Email address: lee.10449@buckeyemail.osu.edu
Office hours: Monday, 3-4 PM, online

GTA Responsibilities
The GTA assigned to the course will hold regular office hours and lead review sessions for any students who need help with class material. The TA may assist with scoring assignments; however, final grades will be assigned by the professor. **Any questions regarding grading should be directed to the professor and not the TA.**

Course Description
This course covers statistical models and methods for the analysis of data arising from longitudinal studies with repeated measurements on subjects over time. Emphasis will be on methodological understanding and applying methods to real data sets, rather than on the underlying mathematical theory.

Prerequisites
STAT 6450 or STAT 6950 or PUBHBIO 6211 or permission of instructor.

Course Learning Objectives
Upon successful completion of the course, students will be able to:
- Identify features of longitudinal and correlated data and describe potential sources of correlation in longitudinal and other studies.
- Prepare graphical or tabular displays of longitudinal data that effectively communicate the patterns of scientific interest.
- Use general linear models to make inferences about the relationship between response and explanatory variables while accounting for the correlation among repeated responses for an individual.
- Use generalized linear mixed effects models or marginal models to analyze outcome data that are continuous or discrete.
- Apply appropriate methods for handling missing data and dropouts in longitudinal studies.
- Use statistical software to conduct appropriate longitudinal data analysis.

Core Competencies

MPH Foundational Competencies
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

MPH–Biostatistics Specialization Competencies
1. Address problems arising in public health and medicine through appropriate statements of hypotheses, study design, data collection, data management, statistical analysis, and interpretation of results
2. Recognize strengths and weaknesses of study designs and data sources commonly encountered in public health
3. Identify strengths and weaknesses of standard analytic methods
4. Describe basic concepts of probability, random variation, and commonly used statistical probability distributions
5. Use computational methods to effectively analyze complex public health and medical data

MS–Biostatistics Specialization Competencies
6. Address problems arising in public health and medicine through appropriate statements of hypotheses, study design, data collection, data management, statistical analysis, and interpretation of results
7. Recognize strengths and weaknesses of study designs, data sources, and analytic methods
8. Explain core concepts of probability, random variation, and commonly used statistical probability distributions and how they relate to statistical inference
9. Use computational methods to effectively analyze complex public health and medical data

A complete list of College of Public Health Competencies is located on the College of Public Health website: https://cph.osu.edu/students/competencies.

Text/Readings
There is **no** required textbook for this class. Lecture notes and readings from various sources will be posted on Carmen, including but not limited to the following textbooks:
- Reference Text: *Applied Longitudinal Analysis*, 2nd edition (2011), by Fitzmaurice, Laird, & Ware. **Available for OSU students** online at this link
- Additional Text: *Analysis of Longitudinal Data*, 2nd edition (2013), by Diggle, Heagerty, Liang, & Zeger

Carmen
There is a Carmen site for this course: https://carmen.osu.edu. All course materials are available via Carmen.

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:
- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (https://admin.resources.osu.edu/buckeyepass/adding-a-device)
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application (https://admin.resources.osu.edu/buckeyepass/installing-the-duo-mobile-application) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357(HELP) and IT support staff will work out a solution with you.

Class Format: How this course works
- **Mode of delivery:** This course is online via asynchronous Distance Learning (DL) mode, with all asynchronous activities accessible via Carmen. There will be only one required Q&A session for which you must be logged into Carmen at a scheduled time, during the exam week, for which you will be able to select between a few options of meeting times.
- **Pace of online activities:** The course material is organized into one-week blocks. Each block starts at 12:00 am on a Sunday and ends at 11:59 pm on a Saturday (see the calendar for specific dates). **Credit hours and work expectations:** This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (e.g., watching lectures, completing lab assignments, completing quizzes) in addition to 6 hours of homework/active learning activities (e.g., answering discussion boards, completing homework assignments) to receive a grade of (C) average.
- **Attendance and participation requirements:** Each block contains (a) recorded lectures to be watched asynchronously, (b) online quizzes, (c) computer labs, and (d) lab self-reviews. Additionally, approximately every other block will contain a homework assignment and a discussion board post. Periodically during the semester, we may ask you for feedback on your learning experience in order to improve the course.

Course Technology
Technology skills needed for this course
- Basic computer and web-browsing skills
- Navigating Carmen (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)

Required equipment
- **Computer:** current Mac (Mac OSX) or PC (Windows 10+) with high-speed internet connection
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Webcam:** built-in or external webcam, fully installed and tested
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

Required software
- **Stata (http://www.stata.com/) *or* R (https://www.r-project.org/):**
  All lecture examples and lab activities will use Stata and R for the purpose of illustration. Students are encouraged to use either Stata or R for homework and exams to get the best computing support from the instructor and TA.
    - R is a free software and runs on a wide variety of UNIX platforms, Windows and MacOS; and RStudio (https://www.rstudio.com/) is an integrated development environment (IDE) for R, which is available in an open source edition and can make the interaction between users and R more friendly.
    - Stata is available free of charge on the PCs in the Cunz Hall computer lab (room 230) and may be purchased for student use by visiting https: //www.stata.com/order/new/edu/gradplans/student-pricing/.
- **Microsoft 365 Copilot (formerly Office 365)**
  All Ohio State students are now eligible for free Microsoft 365 Copilot (formerly Office 365). Full instructions can be found at go.osu.edu/office365help.

Technology support
For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at and support for urgent issues is available 24/7.
- **Self-Service and Chat support:** http://it.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu

Assignments/Assessments

Projects*: 35%*
There will be three projects as part of this course:
1) Project #1 (10%): creating a 1-page "study guide" for the class,
2) Project #2 (10%): analyzing a data set and recording a presentation of a data analysis (in small groups), and
3) Project #3 (15%): participating in a synchronous Q&A session with peers.

Rubrics and additional information will be provided during the semester. Except when clearly stated, **the projects must be completed independently** and students may only consult with the instructor if there are questions (not the TA).

Projects submitted late without an accepted and documented excuse will be penalized 10% per 24-hour period for projects submitted within 72-hours of the deadline (e.g., a project submitted 0.01-24 hours late receives a 10% penalty, 24.01-48 hours late receives a 20% penalty, 48.01-72 hours late receives a 30% penalty, and projects submitted more than 72 hours late receive a 0.)

Exams*: 15%*
There will be one midterm exam (see calendar for date). The exam will be a timed, online exam. Students will have a 48-hour window to complete the exam (a Friday and a Saturday), and the exam must be taken

within the scheduled window. Students will have 100 minutes to complete the exam once it is started. A student cannot stop the test or login/logout to resume the test at a later time once started.

The exam will require the use of statistical software (Stata or R strongly encouraged), and interpretation of software output may also be necessary. **Students are not permitted to communicate with anyone during the exam**, but may use notes, books, and the internet (without communicating with other individuals). **The use of Generative AI during the exam is not permitted**.

Because exams are returned to students as quickly as possible, it is not possible for any student to take a midterm exam late. Students who miss taking any exam will be penalized fully in the absence of a documented and accepted excuse. Students with a problem taking a midterm within the scheduled window must contact the instructor immediately upon discovery of the problem.

Homework: 20%
Homework will include both hand calculations and computer exercises. There will be approximately 8 homework assignments (approximately every other block). **Homework assignments are due on Mondays**, to give you a few extra days after the end of a block to complete them. In order for homework to be graded and returned as quickly as possible, late homework will not be accepted and will receive a zero. The lowest homework score (zero or otherwise) will be deleted before computing the overall homework grade.

For homework in which statistical software is needed, **unedited output is unacceptable** for answering the questions. Students should give a clear statement of the answer from the output, either in words or a table, as appropriate. Additionally, **students should turn in their code that generated the output** used to answer the question. This requirement is most easily satisfied with an appendix to the homework answers containing the code needed for each question.

Students are permitted and encouraged to work together on homework, but **submitted assignments must be written independently, including all code and output from statistical software**.

Lab Activities: 15%
Each recorded lecture has an associated lab assignment. These lab activities will be a mix of computer work and interpretation questions. These activities are intended to illustrate concepts through active learning. Students are permitted and encouraged to work together on lab activities on the Discord channel, but submitted assignments must be written independently, including all code and output from statistical software.

All materials for a block will be simultaneously available for the entire block so that students can complete assignments at times that best fit their schedules. **Lab assignments will be due each Saturday, and assignments not completed by the due date will be given a 0**. There are no exceptions to this rule. The lowest lab assignment score (zero or otherwise) will be deleted before computing the overall Lab Activities grade.

After every lab submission deadline, an answer key will be provided, and **students will be required to review their own work and grade it based on the provided key and a given rubric**. The review is intended to provide quick feedback on lab work, allowing students to identify potential coding and concept issues in a timely manner. Students should complete the self-review before getting access to the new content block.

Discussions: 10%
Throughout the semester, you will participate in approximately biweekly discussion boards designed to reinforce key concepts and promote collaborative learning. Each board will focus on a major theme from recent labs and include both technical and reflective prompts.

For each discussion, you are required to post **one original response** addressing the prompt and **one comment on a peer's response** that adds value (such as clarifying a concept, offering an alternative interpretation, or sharing code or visualization tips).

For weeks that contain a discussion board, the original response will be **due at the same time as the lab is due**, with t**wo additional days to complete the peer's response**. Late submissions will not be accepted. The lowest discussion score (zero or otherwise) will be deleted before computing the overall Discussions grade.

These activities aim to deepen understanding through explanation and critique, encourage peer-to-peer engagement, and provide opportunities to practice communicating statistical reasoning clearly, professionally, and ethically.

Quizzes: 5%
Each recorded lecture has an associated short, online, multiple-choice quiz (repeatedly as questions embedded in the videos and as a full quiz via Carmen) to help reinforce understanding of the covered concepts. Some questions will require students to perform calculations and will require the use of a calculator. Students will not have to use R or Stata during the quizzes (but will be expected to interpret software output).

A grade for the quiz will be assigned. Quiz final grades will be calculated as the response correctness of the Carmen quizzes (the correctness of video-embedded questions will not be assessed). Since the answers will already be available in the video-embedded quiz, only one attempt will be allowed in the CarmenCanvas quiz.

Grading
This course is letter-graded. Final class grade will be determined as follows:

Component	Weight
Quizzes	5%
Lab Activities	15%
Discussions	10%
Homework	20%
Midterm Exam	15%
Project #1	10%
Project #2	10%
Project #3	15%

Any questions regarding the grading should be addressed within one week of the return of the homework or exam. As a general policy, when requested, the regrading will apply to the whole exam or the homework, not just to the specific part which the student thinks there might be a mistake. As a consequence, re-grading may result in either a higher or a lower overall score. Any questions regarding grading should be directed to the professor and not the TA.

Grading Scale*

A	93 to 100
A-	90 to <93
B+	87 to <90
B	83 to <87
B-	80 to <83
C+	77 to <80
C	73 to <77
C-	70 to <73
D+	67 to <70
D	60 to <67
E	Below 60

* The instructor reserves the right to adjust the grading scale if it appears necessary due to overall class performance. These adjustments will only raise a student's grade, not lower it.

Class Policies
- **Attendance and Participation:** This is an asynchronous course with one required synchronous Q&A session during exam week. Students are expected to keep up with weekly blocks and submit assignments on time.
- **Technology Use:** Students must have access to a computer with R or Stata installed, a stable internet connection, and BuckeyePass authentication. Use of Discord for collaborative troubleshooting is encouraged but optional.
- **Academic Integrity:** All submitted work must be your own. Collaboration is allowed only where explicitly stated (e.g., labs and homework discussions), but final submissions must be independently written. Plagiarism, unauthorized assistance, or misrepresentation of work will be reported to the Committee on Academic Misconduct.
- **Generative AI Use:** See the Generative AI Policy section for detailed guidelines. AI can assist with debugging and text polishing but cannot generate full assignment solutions or original ideas. AI can make mistakes—always verify outputs. Disclosure of AI use is required.
- **Prohibited Actions:** Do not upload course materials (lectures, assignments, solutions) to external sites such as Chegg, Quizlet, or similar platforms. Doing so violates copyright and academic integrity policies.
- **Communication:** Use Carmen for official announcements and submissions. Email via Carmen for private inquiries. Discord is recommended for technical questions and peer collaboration.
- **Late Work:** Homework, labs, and discussions will not be accepted late. Projects submitted late will incur penalties as outlined in the syllabus.
- **Respectful Environment:** Maintain professionalism in all communications. Offensive or disruptive behavior will not be tolerated.

Copyright Statement
This syllabus and all course materials (e.g., homework assignments, solution keys, course materials) are under copyright by the instructor and cannot be posted elsewhere without written permission.

Generative AI Policy
Generative AI tools (like Copilot, Gemini, and ChatGPT) can be helpful for learning when used responsibly. In this course, AI may be used **only** for the following purposes:
- Debugging and troubleshooting code.
- Clarifying concepts or requesting examples.
- Polishing text for grammar, clarity, and consistency.

AI **may not** be used to:

- Generate original ideas, interpretations, or make modeling decisions.
- Summarize course concepts or create substantive content.
- Generate full assignment solutions.
- Complete quizzes, exams, or participate in live interactions.

Important: AI can make mistakes—always check the accuracy of any AI-generated output before using it.

Assignment-specific rules:
- **Projects #1:** AI allowed for layout/design and grammar checks; not for summarizing concepts.
- **Projects #2:** AI allowed for debugging and text polishing; not for writing interpretations or analysis.
- **Projects #3:** AI allowed for grammar checks on questions; not for creating questions or during live Q&A.
- **Homework & Labs:** AI allowed for debugging, concept clarification, and text polishing; not for generating answers or code.
- **Discussions:** AI allowed for grammar checks; ideas must be original.
- **Quizzes & Exams:** No AI use permitted.

Disclosure: Students must clearly state when and how AI was used (e.g., "Used ChatGPT for grammar check"). Failure to disclose or unauthorized use of AI is considered academic misconduct under the https://trustees.osu.edu/bylaws-and-rules/code and will be referred to the Committee on Academic Misconduct.

If I suspect that you have used GenAI on an assignment for which it is prohibited, I will ask you to explain your process for completing the assignment in question. Submission of GenAI-generated content as your own original work is considered a violation of Ohio State's Academic Integrity policy and Code of Student Conduct because the work is not your own. The unauthorized use of GenAI tools will result in referral to the Committee on Academic Misconduct. If you are unsure whether a use of AI is appropriate, **ask the instructor before proceeding**.

Office of Student Life: Disability Services

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

If you are ill and need to miss class, including if you are staying home and away from others while experiencing symptoms of a viral infection or fever, please let me know immediately. In cases where illness interacts with an underlying medical condition, please consult with Student Life Disability Services to request reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Mental Health Services

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call

counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Religious Beliefs or Practices Accommodations
Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement and the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the Civil Rights Compliance Office. (Policy: Religious Holidays, Holy Days and Observances)

Academic Misconduct
It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-48.7 (B)). For additional information, see the Code of Student Conduct.

Intellectual Diversity
Ohio State is committed to fostering a culture of open inquiry and intellectual diversity within the classroom. This course will cover a range of information and may include discussions or debates about controversial issues, beliefs, or policies. Any such discussions and debates are intended to support understanding of the approved curriculum and relevant course objectives rather than promote any specific point of view. Students will be assessed on principles applicable to the field of study and the content covered in the course. Preparing students for citizenship includes helping them develop critical

thinking skills that will allow them to reach their own conclusions regarding complex or controversial matters.

Grievances and Solving Problems

A student who encounters a problem related to his/her educational program has a variety of avenues available to seek resolution. According to University Policies, if you have a problem with this class, you should seek to resolve the grievance concerning a grade or academic practice by speaking first with the instructor or professor. Then, if necessary, you may take your case to the department chairperson. Specific procedures are outlined in Faculty Rule 3335-8-23, the CPH Graduate Student Handbook, and the CPH Undergraduate Student Handbook. Grievances against graduate, research, and teaching assistants should be submitted first to the supervising instructor, then to the chairperson of the assistant's department.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Civil Rights Compliance Office:

Online reporting form at http://civilrights.osu.edu/,
Call 614-247-5838 or TTY 614-688-8605,
Or Email civilrights@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Civil Rights Compliance Office to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Course Outline

Week	Starts on	Topics	Readings	Activities
1	Jan 12	Introduction: benefits & challenges	Ch. 1–2	Quiz; Lab #1; HW #1
2	Jan 18	Review of linear models & descriptive statistics	Ch. 3	Quiz; Lab #2; Discussion #1
3	Jan 25	Modeling the covariance	Ch. 7	Quiz; Lab #3; HW #2
4	Feb 1	Modeling the mean & comparing models	Ch. 5–7	Quiz; Lab #4; HW #3; Discussion #2
5	—	**Midterm Exam #1 (Feb 13 & 14)**	N/A	Review
6	Feb 15	Linear Mixed Models: introduction	Ch. 8	Quiz; Lab #5; Discussion #3
7	Feb 22	Fixed vs. random effects & prediction	Ch. 8–9	Quiz; Lab #6; HW #4
8	Mar 1	Generalized Linear Models: introduction & links	Ch. 11	Quiz; Lab #7; Discussion #4
9	Mar 8	Generalized Estimating Equations: introduction	Ch. 11–13	Quiz; Lab #8; HW #5
10	Mar 22	GEE: mean models and binary outcomes	Ch. 12–13	Quiz; Lab #9; Discussion #5
11	Mar 29	Generalized linear mixed models	Ch. 14–16	Quiz; Lab #10; HW #6
12	Apr 5	Missing data	Ch. 17	Quiz; Lab #11; HW #7
13	Apr 12	Multilevel models	Ch. 22	Quiz; Lab #12; Discussion #6
14	Apr 19	Projects 1 & 2	—	—
—	—	**Project 3 (Apr 29 – May 4)**	—	—

Alignment of Competencies with Assessments

Competencies	Labs	Discussion	Homework	Exam	Projects
MPH Foundational Competencies					
Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming, and software, as appropriate (3)	x		x	x	x
Interpret results of data analysis for public health research, policy, or practice (4)	x	x	x	x	x
MPH–Biostatistics Specialization Competencies					
Address problems arising in public health and medicine through appropriate statements of hypotheses, study design, data collection, data management, statistical analysis, and interpretation of results (1)			x	x	x
Recognize strengths and weaknesses of study designs and data sources commonly encountered in public health (2)	x	x	x	x	x
Identify strengths and weaknesses of standard analytic methods (3)	x	x	x	x	x
Describe basic concepts of probability, random variation, and commonly used statistical probability distributions (4)			x	x	
Use computational methods to effectively analyze complex public health and medical data (5)	x		x	x	x
MS–Biostatistics Specialization Competencies					
Address problems arising in public health and medicine through appropriate statements of hypotheses, study design, data collection, data management, statistical analysis, and interpretation of results (6)			x	x	
Recognize strengths and weaknesses of study designs, data sources, and analytic methods (7)	x	x	x	x	x
Explain core concepts of probability, random variation, and commonly used statistical probability distributions and how they relate to statistical inference (8)			x	x	
Use computational methods to effectively analyze complex public health and medical data (9)	x		x	x	x