

SAMPLE SYLLABUS

**COURSE TITLE:**

Biostatistics for Public Health

COURSE NUMBER:

UGPH-GU 9020 G01

INSTRUCTION MODE:

In-person

Summer 2023

If you are enrolled in this course 100% remotely and are not a Go Local/Study Away student for NYU Accra, please make sure that you've completed the online academic orientation via Brightspace so you are aware of the site-specific support structure, policies and procedures. Please contact Dr Nicholas Okai (nno211@nyu.edu) and Ms Berlinder Worbriba-Prah (bw2484@nyu.edu) if you have trouble accessing the Brightspace site.

The syllabus was last updated on: 22-05-2023

Lecturer Contact Information

- Office hours: By Appointment

Teaching Assistant

TBA

Prerequisites

Not applicable

Units earned

4 credits

Course Details

- Class Schedule: Tues/Thurs, 1:00 pm to 4:45 pm GMT
- Location: Rooms will be posted in Albert before your first class.
- Remote Participants: Your instructor will provide you with the Zoom link via NYU Classes.
- COVID-related details: In the interest of protecting the NYU [SITE] community, we are closely following CDC guidance around COVID-19 and adjusting our recommendations and policies accordingly. Your health and well-being are our top priority.
- If you are attending in person, you will be assigned a seat on the first day and are expected to use that seat for the entire semester due to NYU COVID-19 safety protocol. Please note that you are expected to attend every class meeting in-person; however, this may change during the drop/add period if in-person student registration increases significantly or at any point during the semester if local COVID-19 regulations require additional physical distancing.
- Additionally, in-person students will be split into cohorts who will attend sessions [AS INDICATED HERE].

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COURSE DESCRIPTION:

This course introduces basic concepts and techniques in the analysis of public health data. It is an applied course, emphasizing the use, interpretation and limits of statistical analysis. Real-world examples are used as illustrations and computer-based data analysis is integrated into the course. Students will be introduced to the basic principles of statistical software: R programming language. Students will learn how to write code in R to complete exploratory and statistical analysis of public health data.

COURSE LEARNING OBJECTIVES:

Learning Objective	Course component (Lecture # & topic, assignment, etc.)
1. To identify different types of variables in statistics (categorical - nominal, ordinal, and quantitative). To understand the basic concepts of samples versus populations, sample statistics versus populations.	Lectures 1, 2 and Homework 1
2. To understand the framework and characteristics of research studies. To develop your critical thinking ability to question the quality of research design by critiquing the journal article	Lectures 3, 4 and Homework 1
3. To understand how we measure the chances of events occurring using probability. To understand why tests like Mammograms have such a high rate of false positives.	Lectures 5, 6 and Homework 2
4. To understand how to visualize and summarize categorical data. To understand how to visualize and summarize the variation of a single quantitative measurement. To understand how to work with the normal distribution of quantitative measurements.	Lectures 7, 8 & 9 and Homework 2
5. To understand how to reason with the variation in sample statistics from sample to sample	Lectures 10, 11 and Homework 3
6. To understand how we try to obtain answers to our questions about populations of interest using confidence intervals. Identify the type of statistical analysis appropriate for answering specific questions.	Lectures 12, 13 and Homework 3
7. To understand how we try to obtain answers to our questions about populations of interest using hypothesis testing. Identify the type of statistical analysis appropriate for answering specific questions. Recognize tests of association with quantitative and categorical data as they are applied in public health research, and think critically about those applications.	Lectures 14 - 18 and Homework 4
8. To understand what correlation really means and why correlation does not necessarily mean causation. To understand how to build statistical models looking for relationships between two quantitative variables – an explanatory and response variable.	Lectures 19 - 21 and Homework 05
9. To understand how to compare more than two treatment groups and how to approach making multiple comparisons. To understand how to build sophisticated statistical models looking at the relationship between a response variable and multiple explanatory variables. Understand the rationale for multivariable analyses.	Lecture 19 - 23 and Homework 05
10. To take all you have learned throughout the course to question the quality of the statistical analysis portion of a journal article. Interpret and explain research designs and statistical analyses reported in public health and related health journals.	Lecture 24

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COURSE REQUIREMENTS AND EXPECTATIONS:

1. You are expected to come to class on time to prevent disrupting the lecture and classroom activities.
2. Complete all assigned readings before the class session.
3. This course will strictly adhere to NYU policies on plagiarism and academic integrity. (See the attached policy statement at the end of this syllabus)
4. For reading assignments, we will be reading, analyzing, and discussing published public health research studies that demonstrate the research and statistical techniques we are studying in class. For these activities, you are asked to read the research studies and then answer a set of questions about the studies. Assignments will be posted at Brightspace. Assignments must be submitted through Brightspace no later than midnight on the due date. Note: Let me know by the beginning of the next session if your assignment grade is missing.
5. Complete all assignments by the due date and time. Late assignments will not be accepted unless you have a bonafide reason for not handing in on time.
6. Attendance & Participation (10 points): You are expected to attend class and participate in all class sessions. If you cannot attend a certain session, it is your responsibility to email the instructor prior to the start of the class, or in the case of an emergency, immediately upon return.
7. Homework (25 points): There will be 5 weekly assignments. The lowest grade will be dropped. Assignments will consist of textbook questions, reading assignments, and data analysis using R. You can download and set up R (<https://cran.rstudio.com/>) and R studio IDE(www.rstudio.com).
8. Site visit & Guest lecture reflection papers (10 points): There will be two site visits where you will be able to observe how all of the skills you are learning are being applied to real-life public health data. Two guest lectures will enrich your classroom knowledge with additional R-software capabilities and functions relevant to public health. The reflection papers will be due the day after the site visit or guest lecture.
9. Midterm Examination (25 points): The midterm examination will be given as a take-home exam. There will be an in-class review session where you will have the opportunity to ask questions. A sample solution guide will also be posted for your review.
10. Final Examination (30 points): The final examination will be on given as a take-home exam. On the last day of class, we will have in-class review sessions where you will have the opportunity to ask questions from any sessions covered. The final exam will cover all the concepts covered during the course with a particular emphasis on the material we cover after the midterm. Additional guidelines will be handed out with the exam.

Note: For all assignments, you will need a T-83 or T-84 calculator.

GRADING COMPONENTS:

Assignments/Activities	% Of Final Grade
Attendance & Participation	10%
Homework	25%
Site visit & Guest lecture reflection papers	10%
Midterm exam	25%
Final exam	30%

Note: Unless otherwise specified, all written work must be submitted as a Word document. All assignments must be typed (1" margins, Times New Roman or Arial, Font size 11 or 12). Your full name(s) must be on the top of each page.

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GRADING SCALE:

A:	94-100	C+:	77-79
A-:	90-93	C:	73-76
B+:	87-89	C-:	70-72
B:	83-86	D+:	67-69
B-:	80-82	D:	60-66
		F:	<60

BRIGHTSPACE:

Brightspace will be used extensively throughout the semester for assignments, announcements, and communication. Brightspace is accessible at <https://home.nyu.edu/academics>

TECHNOLOGY POLICY:

Mobile devices (e.g., smartphones, pagers, etc.) ringers will be turned off or placed on vibrate prior to class. Laptops and tablets can be used in the classroom to take notes, make calculations, and download/read course materials.

Important Notes:

- Course readings, updates and lecture notes and other handouts will be available on Brightspace.
- Lecture notes will be available for download on Brightspace at least 5 hours prior to class. It is recommended that you print out a copy and bring it to class.
- Please check your e-mail regularly so that you can receive emergency communications and periodic updates about the class.
- The preferred method of communication with the instructor is e-mail. Please use your NYU email account to send correspondences. Your emails should be professional. Email is a formal means of communication in the context of school or work; please sign every message at the bottom, and use polite language, capital letters, punctuation, greetings and salutations. The instructor will endeavor to respond to all emails within 48 hours. However, students should not wait until after Friday to send an email if a response is needed before the following Monday.

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COURSE OUTLINE: This timeline should only be used as a guideline. The course pace and topic covered on any given day will be determined in class.

Lecture No.	Date	Topics	Readings	Assignments Due
	23/05/23	Syllabus	Chapter 1	
1	23/05/23	Introduction to Biostatistics	Chapter 1	
2	23/05/23	Basic Statistical Concepts	Chapter 1	
2	25/05/23	Assessing the Quality of Research and Data Collected	Chapter 2	Homework 01 – 25/05/23
4	25/05/23	Randomness and The Basic Rules of Probability	Chapter 4	
5	25/05/23	Conditional Probability and Bayes Rule	Chapter 4	
6	30/05/23	Visualizing and Summarizing Categorical Data	Chapter 5	
7	30/05/23	Visualizing and Summarizing Quantitative Data	Chapter 5	
8	30/05/23	Working with the Normal Distribution of Data	Chapter 5	
Thursday	01/06/23	Site Visit I: TBA		Homework 02 – 01/06/23
9	06/06/23	Visualizing and Summarizing Sample Statistics – Sample Proportions	Chapter 6 excluding section 6.3.4	
10	06/06/23	Visualizing and Summarizing Sample Statistics – Sample Means	Chapter 6 excluding section 6.3.4	
11	08/06/23	Confidence Intervals for Means and Proportions	Chapter 7 excluding section 7.4.4	Homework 03 – 08/06/23
12	08/06/23	Confidence Intervals for Mean Differences	Chapter 7 excluding section 7.4.4	
13	08/06/23	Hypothesis Testing – Population Proportions	Chapter 8 sections 8.1 to 8.3	
14	08/06/23	Hypothesis Testing – Population Means	Chapter 8 sections 8.4 and 8.5	
	08/06/23	Midterm Exam Distributed– (Take home)		Midterm Due Monday 12/06/2023
Friday	09/06/23	Make-Up Day: Guest Lecture I: TBA		
15	13/06/23	Hypothesis Testing – Population Mean Differences	Chapter 8 section 8.7	
16	13/06/23	Hypothesis Testing – Analysis of 2x2 Tables	Chapter 8 section 8.10	
17	13/06/23	Hypothesis Testing – Types of Error and The Power of the Test	Chapter 8 section 8.11	

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Lecture No.	Date	Topics	Readings	Assignments Due
18	15/06/23	Correlation	Chapter 9 section 9.3	Homework 04 – 15/06/23
19	15/06/23	Simple Linear Regression	Chapter 9.4	
20	15/06/23	Inference for Regression	Chapter 9.5	
Friday				
	16/06/23	Make-Up Day: Guest Lecture II: TBA		
21	20/06/23	Analysis of Variance	Chapter 8.8	
22	20/06/23	Multiple Linear Regression	Chapter 9.6	
23	20/06/23	Integrity in Research: Limitations of Hypothesis Testing	Chapter 10	
Thursday				
	22/06/23	Site Visit II: TBA		Homework 05 – 22/06/23
24	26/06/23	Review session		
	26/06/23	Final Exam (Take home project)		Final Exam Due Monday 29/06/2023

READING LIST:

Required Text

Donoghue, Anthony. Statistical Thinking Through Media Examples, 3rd Edition, Cognella Publishing 2022

You can purchase the textbook at the following link: <https://titles.cognella.com/statistical-thinking-through-media-examples-9781793541963>

Recommended:

DeVeaux, Velleman and Bock. Stats: Data and Models Plus NEW MyLab Statistics with Pearson eText -- Access Card Package (Mystatlab) 4th Edition

https://www.amazon.com/Stats-Models-Statistics-Pearson-Package/dp/0133956490/ref=sr_1_6?keywords=STATS%3A+Data+and+Models&qid=1683559272&sr=8-6

Grolemund and Wickham. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition. Sebastopol, CA : O'Reilly Media 2016

You can have online access at the following link: https://bobcat.library.nyu.edu/primo-explore/search?query=any,contains,R%20for%20Data%20Science:%20Import,%20Tidy,%20Transform,%20Visualize,%20and%20Model%20Data&tab=all&search_scope=all&sortby=rank&vid=NYU&lang=en_US&mode=basic

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GPH DIVERSITY, EQUITY, and INCLUSION (DEI) STATEMENT:

The NYU School of Global Public Health (GPH) is committed to maintaining and celebrating a diverse, just, and inclusive environment for our students, faculty, and staff around the world. To foster this atmosphere and ideals of Diversity, Equity, and Inclusion (DEI), GPH promotes a welcoming learning environment that embraces cultural humility, and respects and values differences. These differences can include race, ethnicity, religion, gender identity, sexual orientation, physical, mental and emotional abilities, socioeconomic status, and other aspects of human diversity. In this course, we encourage students to share and discuss different perspectives, beliefs, and experiences while treating all with dignity and respect.

STATEMENT OF ACADEMIC INTEGRITY:

The NYU School of Global Public Health values both open inquiry and academic integrity. Students in the program are expected to follow standards of excellence set forth by New York University. Such standards include respect, honesty and responsibility. The SGPH does not tolerate violations of academic integrity including:

- Plagiarism
- Cheating on an exam
- Submitting your own work toward requirements in more than one course without prior approval from the instructor
- Collaborating with other students for work expected to be completed individually
- Giving your work to another student to submit as his/her own
- Purchasing or using papers or work online or from a commercial firm and presenting it as your own work

Students are expected to familiarize themselves with the SGPH and University's policy on academic integrity as they will be expected to adhere to such policies at all times – as a student and alumni of New York University.

Plagiarism

Plagiarism, whether intended or not, is not tolerated in the CGPH. Plagiarism involves presenting ideas and/or words without acknowledging the source and includes any of the following acts:

- ❑ Using a phrase, sentence, or passage from another writer's work without using quotation marks
- ❑ Paraphrasing a passage from another writer's work without attribution
- ❑ Presenting facts, ideas, or written text gathered or downloaded from the Internet as your own
- ❑ Submitting another student's work with your name on it
- ❑ Submitting your own work toward requirements in more than one course without prior approval from the instructor
- ❑ Purchasing a paper or "research" from a term paper mill.

Students in the CGPH and CGPH courses are responsible for understanding what constitutes plagiarism. Students are encouraged to discuss specific questions with faculty instructors and to utilize the many resources available at New York University.

Disciplinary Sanctions

When a professor suspects cheating, plagiarism, and/or other forms of academic dishonesty, appropriate disciplinary action is as follows:

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- ☒ The Professor will meet with the student to discuss, and present evidence for the particular violation, giving the student opportunity to refute or deny the charge(s).
- ☒ If the Professor confirms that violation(s), he/she, in consultation with the Chairperson or Program Director may take any of the following actions:
 - o Allow the student to redo the assignment
 - o Lower the grade for the work in question
 - o Assign a grade of F for the work in question
 - o Assign a grade of F for the course
 - o Recommend dismissal

Once an action(s) is taken, the Professor will inform the Chairperson or Program Director and inform the student in writing, instructing the student to schedule an appointment with the Senior Associate Dean for Academic Affairs, as a final step. The student has the right to appeal the action taken in accordance with the GPH Student Complaint Procedure.

STUDENTS WITH DISABILITIES:

Students with disabilities should contact the Moses Center for Students with Disabilities regarding the resources available to them, and to determine what classroom accommodations should be made available. More information about the Moses Center can be found here: <https://www.nyu.edu/life/safety-health-wellness/students-with-disabilities.html>. Students requesting accommodation must obtain a letter from the Moses Center to provide to me as early in the semester as possible.

Teaching & Learning Philosophy

I am a staunch advocate of the notion that everyone learns in their unique way. This conviction prompts me to recognize the various learner types who enroll in my classes year after year and semester after semester. There are times when the difference is obvious, such as when there are students in the class who have obvious difficulties. Other times, the distinction is subtle and requires more complex layers of interaction to understand. In each scenario, I employ a variety of techniques, relevant examples, learning resources, and tools to effectively target the various learner groups. Anyone who needs a specific provision for the course materials, how the course is delivered, or for any other reason should contact me in person or by email (preferably within the first 2 weeks of class).

Your Instructor

Dr Adolphina Addo-Lartey earned a BSc (Hons) in Biochemistry and Nutrition from the University of Ghana, an MS in Human Nutrition from Iowa State University (USA), and a PhD in Public Health from the University of Massachusetts, Amherst (USA). Her research focus is on epidemiological studies in women's health. She has carried out extensive research on gender and health, reproductive health, risk factors for chronic disease, maternity and child health, nutrition and food security. She has prior expertise in research design, managing data, and performing statistical analysis for epidemiological studies. Dr Addo-Lartey is a senior lecturer in the Department of Epidemiology and Disease Control at the University of Ghana's School of Public Health. Her courses include "Public Health Research Methods", "Advanced Epidemiology", "Basic Statistics for Clinical Trials", and "Design/Analysis of Epidemiological Studies". She also teaches graduate and undergraduate courses at the NYU College of Global Public

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Health (New York) and NYU Accra, including "Assessment of Community Health Needs and Resources," "Intermediate Epidemiology," "Epidemiology for Global Health," and "Biostatistics for Public Health."