University of Florida
College of Public Health & Health Professions Syllabus
PHC 6011: Epidemiology Methods II (3 credit hours)
Summer A/C 2021, <u>May 15 through June 18, 2021</u>
Delivery Format: Online through Zoom, MW 9:30AM - 1.45PM
Canvas Course Website: https://lss.at.u.edu/

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Preferred course communications: Email

Prerequisites
PHC 6000, PHC 6052, and PHC 6053, or instructor permission. Students are required to have applied SAS or R training, and must have access to a laptop with either SAS version 9.4 or higher in-class use. This class assumes an advanced competency with epidemiologic principles and vocabulary, in addition to a working knowledge of introductory statistical inference and basic skills conducting regression analysis.

Relation to Program Outcomes
This course will facilitate graduate students to apply the essential analytical methods in epidemiological research. It will help students to learn to design their own project and publish their own study. The course also serves as a bridge toward more complex analytical methods courses (i.e., PHC 7017), such as longitudinal study, cluster randomization, heterogeneous data analysis, developmental trajectory analysis, mixed and generalized mixed effects modeling, cusp catastrophe modeling, and probabilistic discrete event systems modeling to tackle challenging research questions.

PURPOSE AND OUTCOME

Course Overview

This course covers essential analytic methods for research in epidemiology through lectures and directed practice with real data. A course project is used to help students strengthen their foundation in quantitative analysis and gain experience in peer-review productivity based on secondary data.

Course Objectives and/or Goals

This course builds upon PHC 6000 (Epidemiology Methods I) to consolidate the understanding of epidemiologic concepts and methods. Using data from the National Health and Nutrition Examination Survey (NHANES), students will 1) identify a research question; define a causal model, form relevant study hypotheses; 2) gain experience in data management; 3) conduct analyses to describe the study sample, test study hypotheses, and sum up findings; and 4) interpret results statistically, draw conclusions epidemiologically, and point out potential limitations. The ultimate goal is *to train students from a guided researcher to an independent researcher* and prepare students for more advanced training.

Instructional Methods

This course consists of 11 sessions, each of which will last 4.25 hours. Each session is divided into two parts: Lecture and practice. Each session starts with lecture (45-60 minutes) on theoretical aspect of epidemiologic methods and brief discussion of the methodology. In practice sessions, instructor will provide a manual for students to practice the methods covered in the lecture using software SAS. Students are asked to sum up the main analytical results, plus a brief description, and turn in for feedback and scoring. Practice sections will also be used for students to prepare their own projects and present online. Upon completion of the project, students will have generated a research question, compiled and analyzed data to address this question, and constructed a draft manuscript that would be suitable for peer-reviewed journal submission.

DESCRIPTION OF COURSE CONTENT

Daily Course Schedule

Session and Date	Topics (♣ = lecture, ☺ = practice)
May 10, Monday Session I 9:30am-1:45pm	♣ Introduction to the course ♣ Population, target population, research topic selection ♣ Tasks of epidemiology: distribution, etiology, interventions, or methods ☺ Overview of the NHANES ☺ Loading and checking NHANES data, get familiar with the data ☺ HW#1: Conceiving a study, including title, main questions and turn in.
May 12, Wednesday Session II 9:30am-1:45pm	♣ Characters, variables, data; coding (from survey questions to variables) ♣ Plan and defend your topic selection and abstract development ♣ Quantitative methods for description: Tables and figures ☺ Code demographic variables ☺ Create Table 1 to describe the sample for your own project ☺ HW#2: Work on research plan (including an abstract) and turn in for feedback
May 17, Monday Session III 9:30am-1:45pm	♣ Causes, risk factors and causal relationship ♣ Bivariate analyses: Student t-test, chi-square test, and linear correlation ♣ What does p value mean to epidemiologists? ☺ Conduct chi-square, t-test and linear correlation draw statistical conclusions ☺ HW#3: Sum up main findings in a table with a brief description, and turn in. ☺ Start to put study project in shape with results from bivariate analysis.
May 19, Wednesday Session IV 9:30am-1:45pm	♣ Multivariate analysis, outcome, predictor (risk factor) and covariates ♣ Linear regression, logistic regression and Poisson regression ♣ Regression result interpretation ☺ Conduct regression using one or two of the three methods ☺ HW#4: Update study project with results from multivariate analysis
May 24, Monday Session V 9:30am-1:45pm	♣ Quantitative method for analyzing time-to-event data ♣ Survival model to quantify the patterns ♣ Cox (proportional hazards) regression to assess influential factors ☺ Conduct survival modeling and Cox regression model analysis ☺ HW#5: Further improve study, update Tables 1-3, use figures/more tables.
May 26, Wednesday Session VI 9:30am-1:45pm	♣ Quantitative method to assess interaction and mediation in causal inference ☺ Conduct interaction and mediation analysis (no homework) ☺ Questions and answers of your own project online ☺ Work on your own study project to further improve analysis and writing
May 31, Memory day	National holiday, no class
June 2, Wednesday Session VII 9:30am-1:45pm	♣ Common data errors: Misreport, lack of sensitivity and specificity of lab test ♣ Inadequate reliability and validity of a measurement instrument ♣ Consequences of data error – Misclassification jeopardizing conclusions ☺ Work on your own project ☺ Questions and answers of your own project online ☺ Turn in the 1st draft for review and feedback by 2 randomly picked classmates ☺ Review 2 randomly assigned papers and turned in feedback by next session
June 7, Monday Session VIII 9:30am-1:45pm	♣ Missing data and imputing ♣ Sensitivity analyses using imputed data ☺ Use imputing method for your own study if applicable ☺ Paper revision based on feedback from TA, instructor and peer classmates.
June 9, Wednesday Session IX 9:30am-1:45pm	♣ Causal inference with data and statistical method ♣ Sample size and statistical power ☺ Conduct power analysis to check your project ☺ Submit finalized paper and prepare for final presentation
June 14 & 17, M&W Session X & XI 9:30am-1:45pm	☺ Online presentation: 10 min talk (10-14 slides) and 5 min question ☺ Immediately scoring after presentation by classmates and instructor ☺ Score will be collected via anonymous zoom pulling and release in class. ☺ Finalized written project due by May 19, 5:PM.

About the Project

Each student must have your own project. By completing the project, students are expected to: 1) Learn how to come up with a research question and study hypotheses; 2) find data and variables, conduct the relevant analyses to test the hypotheses; and 3) write up and present the study. These three consecutive parts serve as a mock research project for students to develop skills for independent research.

Milestone Works on the project

Step I. Students are expected to identify a research question, form a causal framework with testable hypotheses to address the question, select relevant variables and analytical plan for data analysis to test the study hypothesis. Write a brief summary including project title, a summary (like an abstract, one page, double spaced) justifying your selection, plus figure showing the proposed causal framework and 3-5 references. Complete and turn in by session II.

Step II: Along with the progress of method learning in class, students are expected to conduct data analysis for their own project, including change and revision of the project. This process will continue till Sessions VII and VIII for students (in two groups) to turn in the first written draft alternatively. Students will receive feedback within a week from the Instructor and classmates for revision.

Step III: Students are asked to finalize the project by addressing reviewers' comments/critiques. Based on the writing up, students prepare a presentation 10-15 minutes (depending on the total number of enrolled students). Student presentation will be complete in the last two sessions.

Peer review for feedback

All students each have opportunities to review two writing drafts for two classmates. To mimic the peer review proposal in the real world, written drafts will be randomly assigned to individual students by the Instructor/TA to ensure blindness of the review process.

Scoring of the Presentation

Presenting student receives score 1 to 10 from two sources: 1) All classmates who participate but do not present, and 2) the Instructor. Mean score will be computed for final score.

Course Materials and Technology

Throughout the course, we will analyze data from the National Health and Nutrition Examination Survey (NHANES). De-identified, publicly-accessible versions of this data are available through the ICPSR website (www.icpsr.umich.edu). There are 4 waves of data, and each can be found by searching for the term \Add Health" within ICPSR.

IRB considerations are very important, and one must obtain IRB approval for conducting human subjects research. For the purposes of this course only, IRB approval is not required to use the NHANES data, since we are not conducting research for publication purpose; rather, we are simply completing course exercises. If, however, you wish to present your findings anywhere outside this classroom, you will need to apply for an IRB approval through the website (https://my.irb.u.edu). A quick approach to apply IRB approval for using NHAUES is to ask for an expedited review since the data are available to the public. All of you are encouraged to apply for IRB for your research question, as this will permit maximum flexibility for presenting your findings!

For all class sessions, students are expected to have a compute with SAS version 9.4 or higher or access to UF APP for SAS. I use SAS more often than other software because of its efficiency in managing large and complex data, good for record keeping and reliability in statistical methods. It is also okay with me if you prefer to use other software as long as you can achieve the goal for this class.

To support online teaching, a lab manual has been prepared to guide students in conducting all statistical analysis and writing a draft paper for publication. It will be distributed prior to practice for relevant sessions.

For technical support for this class, not related to SAS or R programing, please contact the UF Help Desk at:
- ✓ Learning-support@ufl.edu
- ✓ (352) 392-HELP - select option 2
- ✓ https://lss.at.ufl.edu/help.shtml

ACADEMIC REQUIREMENTS AND GRADING

Textbooks

[Required] Woodward M. 2014. *Epidemiology: Study Design and Data Analysis* (3rd Ed), CRC Press
[Recommended] Chen, Xinguang, 2021. Quantitative E*pidemiology*. Springer (to be published). Chapters are consistent with most of the sessions and will be distributed for review.
[Recommended] Chen D & Chen J. *Statistical regression modeling with R: Longitudinal and multi-level modeling*, Springer, 2021.

Important: Read Additional article-length readings will be assigned in class as needed.

Assignments and Grading

Requirement	Due date	Points (105)
Class attendance (11 times), deduct 1 for each absence	At the same day	10
Homework (5), 6 points each	Before next session	30
First draft of the paper of your project	By session VII	20
Peer review by instructor, TA and 2 randomly picked classmates	One week	10
Final draft after revision with feedback from reviews	By session IX	15
Online presentation	Presentation day	20

Note that these components sum to 105. The possible point total is set at 100 points. This is done to help you in the event that you need to drop a focal point quiz or miss a section of student presentations as a result of unforeseen attendance issues.

Point System

Point earned	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	<60
Letter grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
Grade points	4.0	3.67	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	0.67	0.00

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at: http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Exam Policy: No mid-term and final exam for this course.

Policy Related to Makeups of Class Work

Please note: Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported. The ticket number will document the time and date of the problem. You MUST e-mail me within 24 hours of the technical difficulty if you wish to request a make-up.

Policy Related to Required Class Attendance

Class attendance is mandatory. Excused absences follow the criteria of the UF Graduate Catalogue (e.g., illness, serious family emergency, military obligations, religious holidays), and should be communicated to the instructor prior to the missed class day when possible. UF rules require attendance during the first two course sessions. Missing more than two scheduled sessions without excuse (each session is about 4 hours of instruction) will result in a failure. Students are responsible for all material presented in class and meeting the scheduled due dates for class assignments.

All faculty are bound by the UF policy for excused absences. For information regarding the UF Attendance Policy see the Registrar website for additional details:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT

Expectations Regarding Course Behavior

Please come to class on time (login to zoom conference) and be prepared to stay until the time scheduled as the end of class. We think your investment in the degree is worth maximizing your in-class learning experience, and we expect to provide materials that utilize the full, scheduled class times. The use of cell phones is not permitted. Please turn them off or, if you expect urgent calls, set them to vibrate."

Communication Guidelines

Assistance with course material is available during scheduled course hours or by appointment. Emailed questions are mostly welcome given the conditions for anti-COVID-19. We aim to address all course-related inquiries within 24 hours of receipt (or on Monday if the email was sent on Friday). Please do not re-send the same question until the appropriate time frame has elapsed (24 hours or end of day Monday for emails sent on Friday). Student success and understanding is of the utmost importance, so each email receives careful consideration. Because the number of students in the course is not small, substantial time may be spent by the instructor and TA on emailed concerns; your patience and understanding is appreciated. When emailing a question, please also copy the TA, as this may increase your chances of getting a quick reply! Also, please avoid replaying to the whole class unless required.

Academic Integrity

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

> "**We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity**."

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

> **"On my honor, I have neither given nor received unauthorized aid in doing this assignment."**

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/
http://gradschool.ufl.edu/students/introduction.html
Please remember cheating, lying, misrepresentation, or plagiarism in any form is an unacceptable and inexcusable behavior.

Online Faculty Course Evaluation Process

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

It is very important to me that you are able to develop a set of epidemiologic tools in this course that you will find useful in your career. Naturally, the presentation of some tools may be stronger than others. Your feedback on this issue is extremely valuable. Please feel free to comment on what strategies worked and which might be improved. Your input will be essential for us to modify future versions of this course to leverage such knowledge of strengths and weaknesses. As an additional consideration, these evaluations are also useful at the University level, as they are examined in the context of faculty tenure and promotion procedures.

SUPPORT SERVICES

Accommodations for Students with Disabilities

If you require classroom accommodation because of a disability, you must register with the Dean of Students Office http://www.dso.ufl.edu within the first week of class. The Dean of Students Office will provide documentation of accommodations to you, which you then give to me as the instructor of the course to receive accommodations. Please make sure you provide this letter to me by the end of the second week of the course. The College is committed to providing reasonable accommodations to assist students in their coursework.

Counseling and Student Health

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.
- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: http://www.counseling.ufl.edu. On line and in person assistance is available.
- You Matter We Care website: http://www.umatter.ufl.edu/. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: https://shcc.ufl.edu/
- Crisis intervention is always available 24/7 from:
Alachua County Crisis Center
(352) 264-6789
http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.