

University of Florida
College of Public Health & Health Professions Syllabus
PHC 6051 Biostatistical Methods II
3 credits, Spring 2023

Delivery Format: On-Campus Canvas: <http://elearning.ufl.edu>

Instructor: Jonathan Fischer
 Location: HPNP G201
 Times: Mon 1:55 – 2:45 pm
 Wed 1:55 – 3:50 pm
 Phone Number: 352-294-5459
 Email Address: jfischer1@ufl.edu
 Office Hours: TBD
 Teaching Assistants: TBD
 Preferred Course Communications: Canvas messages

Prerequisites: *PHC6050c (Biostatistical Methods I) or permission of instructor. You must also have access to R.*

PURPOSE AND OUTCOME

Course Overview

This is the second course of a two-course sequence with the purpose of providing students with the fundamentals of biostatistical data analysis. This course focuses on extensions of linear regression. Students will learn methods for binary, count, and multinomial data, including generalized linear models; mixed effects models will also be covered. Students will learn to use the statistical package R for data analysis.

Relation to Program Outcomes

This course teaches students fundamental biostatistics concepts and methods and how to apply them, interpret results, and communicate technical concepts effectively.

Course Objectives and/or Goals

Upon successful completion of the course, students should be able to:

- Formulate a statistical problem in terms of an extended linear regression model in a way that meets the goals of a collaborating health scientist
- Apply and interpret methods for binary, multinomial, and count data
- Describe and interpret the basic theory of generalized linear models
- Apply and interpret methods utilizing random effects
- Interpret statistical analyses while remaining aware of limitations.

Instructional Methods

Lectures will consist of a mixture of slides, data analysis demonstrations in R, and whiteboard use. There are several homework assignments and two take-home exams.

Topical Outline/Course Schedule

| Days | Topic | Readings | Assignment |
|-------------|---------------------------------|--------------------------|------------|
| Jan 9 & 11 | Introduction, likelihood theory | Appendix A, Chapter 1 | |
| Jan 18 | Binary and binomial data | Chapters 2-4 | |
| Jan 23 & 25 | Binary and binomial data | Chapters 2-4 | HW 1 |

| Days | Topic | Readings | Assignment |
|----------------|---------------------------------------|------------------|------------|
| Jan 30 & Feb 1 | Binary and binomial data | Chapters 2-4 | |
| Feb 6 & 8 | Count regression | Chapter 5 | HW 2 |
| Feb 13 & 15 | Contingency tables | Chapter 6 | |
| Feb 20 & 22 | Multinomial data | Chapter 7 | HW 3 |
| Feb 27 & Mar 1 | Generalized linear models | Chapters 8-9 | |
| Mar 6 & 8 | Generalized linear models | Chapters 8-9 | HW 4 |
| Mar 20 & 22 | Generalized linear models | Chapters 8-9 | Exam 1 |
| Mar 21 & 29 | Random effects models | Chapter 10 | |
| Apr 3 & 5 | Random effects models | Chapter 10 | HW 5 |
| Apr 10 & 12 | Repeated measures & longitudinal data | Chapters 11 & 13 | |
| Apr 17 & 19 | Repeated measures & longitudinal data | Chapters 11 & 13 | HW 6 |
| Apr 24 & 26 | GLMMs and GEEs | | |
| ----- | Exam week | | Exam 2 |

Course Materials and Technology

Textbook: Extending the Linear Model with R: Generalized Linear, Mixed Effects, and Nonparametric Regression Models, Second Edition (2016), by Julian J. Faraway. Chapman & Hall, Boca Raton, Florida. ISBN: 978-1-4987-2096-0

Software: Students will need to use R in this course. R and RStudio can be downloaded free from <https://www.r-project.org/> and <https://posit.co/>.

For technical support for this class, 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

Assignments

Grading

| Requirement | Percent of final grade | Notes |
|-------------|------------------------|--------------------|
| Homework | 60% | 6 x 10% |
| Exams | 40% | 2 x 20%; take-home |

Please be aware that a C- is not an acceptable grade for graduate students. The GPA for graduate students must be 3.0 based on 5000 level courses and above to graduate. A grade of C counts toward a graduate degree only if based on credits in courses numbered 5000 or higher that have been earned with a B+ or higher.

| Percentage Earned | Letter Grade |
|-------------------|--------------|
| [93,100] | A |
| [90,93) | A- |
| [87,90) | B+ |
| [83-87) | B |
| [80-83) | B- |
| [77,80) | C+ |
| [73,77) | C |
| [70,73) | C- |
| [67,70) | D+ |
| [63,67) | D |
| [60,63) | D- |
| < 60 | E |

| Letter Grade | Grade Points |
|--------------|--------------|
| A | 4.0 |
| A- | 3.67 |
| B+ | 3.33 |
| B | 3.0 |
| B- | 2.67 |
| C+ | 2.33 |
| C | 2.0 |
| C- | 1.67 |
| D+ | 1.33 |
| D | 1.0 |
| D- | 0.67 |
| E | 0.0 |
| WF | 0.0 |
| I | 0.0 |
| NG | 0.0 |
| S-U | 0.0 |

More information on UF grading policy may be found at <https://catalog.ufl.edu/graduate/regulations/>

Policy Related to Make up Exams or Other Work

Please notify me as soon as possible if unanticipated circumstances arise which interfere with your ability to complete an assignment on-time. Late work without prior notification and approval (unless there is an emergency) will receive a zero. Late work with prior approval (or due to an emergency) will be eligible for full credit. Any requests for make-ups due to technical issues must be accompanied by the ticket number received from e-learning support when the problem was reported to them. The ticket number will document the time and date of the problem. You must e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Policy Related to Required Class Attendance

We will follow the UF Attendance Policy. Please note all faculty are bound by the UF policy for excused absences. Excused absences must be consistent with university policies in the Graduate Catalog (<https://catalog.ufl.edu/graduate/regulations/>).

STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT

Expectations Regarding Course Behavior

Students are expected to show up for class prepared and on-time. Cell phones are to be silenced during class unless there is an emergency, in which case please inform the instructor.

Communication Guidelines

Please see the guidelines linked here: <http://biostat.ufl.edu/current-students/e-learning-resources/e-learning-basics/etiquette-online/>.

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 unacceptable and inexcusable behavior.

Online Faculty Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Policy Related to Guests Attending Class:

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee (e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all

courses. No further extensions will be granted. Students are responsible for course material regardless of attendance. For additional information, please review the Classroom Guests of Students policy in its entirety. Link to full policy: <http://facstaff.phhp.ufl.edu/services/resourceguide/getstarted.htm>

SUPPORT SERVICES

Accommodations for Students with Disabilities

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. [Click here to get started with the Disability Resource Center](#). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

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.

Inclusive Learning Environment

Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We

further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: www.multicultural.ufl.edu