Instructor Name: Babette Brumback, Ph.D.
Office Number: CTRB 5244
Phone Number: 352-294-5909
Email Address: brumback@ufl.edu
Campus Course Hours: Monday 3:00-4:55 and Wednesdays 3:00-3:50
Campus Course Room: HPNP G-307 (room cap of 40)
Office Hours: Wednesdays 4-5pm and by appointment
Preferred Course Communications: e-mail

Prerequisites: PHC 6052 and 6053 or equivalent, and knowledge of SAS and R. Students must own a laptop that can run the statistical package R, which is freely available at http://cran.r-project.org/, as well as SAS.

PURPOSE AND OUTCOME

Course Overview
Concepts and methods for causal inference from randomized trials and observational studies.

Relation to Program Outcomes
This course serves the knowledge and skills student learning objectives by preparing students to communicate the underpinning of biostatistics concepts and methods and to apply biostatistical concepts and methods on one’s own, including interpretation and communication of results.

Course Objectives and/or Goals
Upon successful completion of the course, students should be able to:

• Formulate and explain assumptions required for causal inference from randomized trials or observational studies.
• Adjust for confounding using statistical methods.
• Use causal directed acyclic graphs to formulate and assess statistical methods for causal inference.
• Explain selection bias and measurement bias and methods used for bias adjustment.
• Apply methods for standardization based on exposure or outcome models.
• Explain and apply propensity score methods.
• Explain and apply instrumental variables methods to adjust for treatment non-adherence.
• Explain and apply methods for causal inference from complex longitudinal data.

Instructional Methods
Lectures with slides, data analysis demonstrations in R and SAS, and whiteboard use. Ungraded homework assignments and graded quizzes. Two in-class exams.
Topical Outline/Course Schedule

1. Introduction, Randomization (Jan 6, 8)
2. Observational Studies, Effect Modification, Interaction (Jan 13, 15)
3. Directed Acyclic Graphs, Path Analysis, Front Door method (Jan 22, 27, 29)
4. NO CLASS Mon Jan 20 (Holiday)
5. Confounding, Difference in Differences, Selection Bias, Measurement Bias (Feb 3, 5, 10)
6. Random Variability, Why Model (Feb 12)
7. Marginal Structural Models (MSMs) and Estimation of MSMs (Feb 17,19)
8. EXAM ONE (Feb 24)
9. Review Exam One (Feb 26)
10. NO CLASS SPRING BREAK (Mar 2, 4)
11. Outcome Regression, Propensity Scores, Propensity Score Calibration (Mar 9, 11)
12. G-Estimation of Structural Nested Models, Mediation (Mar 16, 18)
13. NO CLASS due to ENAR Meeting (Mar 22, 25)
14. Instrumental Variables Estimation (Mar 30, Apr 1)
15. Causal Survival Analysis, Asymmetric Sequence Ratio (Apr 6, 8)
17. EXAM TWO (Apr 20)
18. Review Exam Two (Apr 22)

Course Materials and Technology


Additional Course Materials Available via E-Learning at lss.at.ufl.edu

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](https://lss.at.ufl.edu/help.shtml)

ACADEMIC REQUIREMENTS AND GRADING

Assignments

Students are expected to be actively involved in each class, including sharing comments of required reading, discussing answers and questions to homework assignments, and participating in class discussion.

The overall grade will include quizzes, class participation and two in-class exams. Class participation will include weekly attendance, sharing reading comments, and leading and participating in discussion. Students are encouraged to discuss either in groups or with the instructor on homework assignments.

Class participation: 10%
Quizzes: 30%
Exam 1 (mid-semester): 30%
Exam 2 (final week of classes): 30%

The grading scale for this course consists of the standard scale, including minus grades, below. Percentages will be rounded to the nearest grade.

93% - 100% = A
90% - 92% = A-
87% - 89% = B+
83% - 86% = B
80% - 82% = B-
77% - 79% = C+
73% - 76% = C
70% - 72% = C-
67% - 69% = D+
63% - 66% = D
60% - 62% = D-
Below 60% = E

Please be aware that a C- is not an acceptable grade for graduate students. A grade of C counts toward a graduate degree only if an equal number of credits in courses numbered 5000 or higher have been earned with an A.

Letter grade to grade point conversions fixed by UF:

<table>
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<tr>
<th>Letter Grade</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D+</th>
<th>D</th>
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<th>E</th>
<th>WF</th>
<th>I</th>
<th>NG</th>
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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
The two exams and quizzes are conducted in class. Students are bound by the UF honor code (see below) and may neither give nor receive aid on the exams. Students may not share exams or quizzes or solutions with anyone else at any time, even after the course is finished.

Policy Related to Make up Exams or Other Work
In the event of unusual circumstances, a student could receive an extension of the due-date to a take-home exam, or a make-up exam if it is in class, or an incomplete grade in the course.

Policy Related to Required Class Attendance
Attendance of all class sessions is expected. We will follow the UF Attendance Policy. 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
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
Students are expected to participate in class discussions. Assignments must be clearly written in reasonably good English.

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/scrr/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 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/.

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 website 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.