

BIOS 776: Causal Inference in Biomedical Research (Spring 2015)

PREREQUISITES: BIOS 661 and 663, or permission of the instructor

LECTURE HOURS: Monday, Wednesday 2:30 – 3:45 PM
Classroom: 228 Rosenau on Monday, 235 Rosenau on Wednesday

COURSE WEBSITE: <https://www.bios.unc.edu/~mhudgens/bios/776/2015/bios776.html>

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Office Hours: TBD

Graders: TBD

OBJECTIVE: This course will consider drawing inference about causal effects in a variety of settings using the potential outcomes framework. Examples will be drawn mostly from medical and epidemiologic research.

REQUIRED TEXT: *Causal Inference* by Hernan and Robins (2015). Please use version of the book posted on the course website.

COMPUTING SOFTWARE: Some assignments will require computation using software such as SAS or R.

COURSEWORK:	% Grade
Homework	60
Midterm Exam: In class Wednesday March 4	20
Final Exam: 8-10a Tuesday May 5	<u>20</u>
	100

COURSE OUTLINE:

- Introduction to potential outcomes
- Randomized experiments versus observational studies
- Effect modification
- Interaction
- Directed acyclic graphs
- Confounding
- Selection bias
- Measurement bias
- IP weighting and marginal structural models
- Parametric g-formula
- G-estimation of structural nested models
- Outcome regression and propensity scores
- Additional topics, time permitting, such as interference, principal stratification, instrumental variables

HONOR CODE:

The University of North Carolina at Chapel Hill has had a student-led honor system for over 100 years. Academic integrity is at the heart of Carolina and we all are responsible for upholding the ideals of honor and integrity. The student-led Honor System is responsible for adjudicating any suspected violations of the Honor Code and all suspected instances of academic dishonesty will be reported to the honor system. Information, including your responsibilities as a student is outlined in the Instrument of Student Judicial Governance. Your full participation and observance of the Honor Code is expected.

All academic work in this course, including homeworks and the exams, is to be your own work.

For additional information: <http://studentconduct.unc.edu/>

Updated: 6 Jan 2015