BIOS 776: CAUSAL INFERENCE IN BIOMEDICAL RESEARCH

SPRING 2019

PREREQUISITES:	BIOS 661 and 663, or permission of the instructor
LECTURE HOURS:	Tuesday, Thursday 9:30 – 10:45 AM Classroom: 230 Rosenau
COURSE WEBSITE:	http://www.bios.unc.edu/~mhudgens/bios/776/2019/bios776.html
INSTRUCTOR:	Michael G Hudgens, PhD Professor Department of Biostatistics, CB #7420 3107C McGavran-Greenberg Hall Email: mhudgens@bios.unc.edu Phone: 919-966-7253 Office Hours: TBD Graders: Jipcy Amador, Bridget Lin Office Hours: 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 (2019). 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	50
Midterm Exam: In class, Thursday, March 7	25
Final Exam: 8a, Friday, May 3	<u>25</u>
	100

The course final exam will be given in compliance with UNC final exam regulations and according to the UNC Final Exam calendar.

GRADING: H 90-100%, P 70-89%, L 55-69%, F <55%

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 instrumental variable estimation, causal survival analysis, and time varying exposures

SYLLABUS CHANGES:

The instructor reserves the right to make changes to the syllabus, including the homework due dates and test dates. These changes will be announced as early as possible.

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/

DIVERSITY/INCLUSION:

Valuing, Recognizing, and Encouraging Diversity: Promoting and valuing diversity in the classroom enriches learning and broadens everyone's perspectives. Inclusion and tolerance can lead to respect for others and their opinions and is critical to maximizing the learning that we expect in this course. Our own closely held ideas and personal comfort zones may be challenged. The results, however, create a sense of community and promote excellence in the learning environment. Diversity includes consideration of (1) the variety of life experiences others have had, and (2) factors related to "diversity of presence," including age, economic circumstances, ethnic identification, disability, gender, geographic origin, race, religion, sexual orientation, social position. This class will follow principles of inclusion, respect, tolerance, and acceptance that support the values of diversity.

Updated: 2 Jan 2019