RUTGERS
School of Public Health

Course Title: *Intermediate Biostatistics*

Course Number: *BIST 0714*

Course Pre- and Co-requisite(s): *None*

Course Location: *Online*

Course Date & Time: *Thursday 6:30-8:30*

Course Instructor: Jason Roy, PhD

Professor of Biostatistics

Rutgers School of Public Health

jason.roy@rutgers.edu

Office Hours: *By appointment or a preferred time TBD*

Course Assistant: *none*

Course Website: *canvas.rutgers.edu*

Recommended Course Text: Vittinghoff, E, Glidden, DV, Shiboski, SC, McCulloch, CE. *Regression Methods in Biostatistics, Linear, Logistic, Survival, and Repeated Measures Models.* 2nd Edition. Springer.

Weiss N, Koepsell T. *Epidemiologic Methods,* 2nd Edition. New York: Oxford UP; 2014.

Course Description: *This course is designed for students to take a deeper dive into modern topics in biostatistics. The course is organized by aims of the research, rather than by statistical methods. Topics include methods for randomized trials, observational studies, quasi-experimental studies, and dealing with complexities such as missing data. Within each research topic, a variety of methods will be learned, with an emphasis on assumptions, interpretation, and strengths/weaknesses of each method. Through a combination of lectures and hands-on assignments, students will learn to identify an appropriate study design to answer a given research question, identify possible sources of bias, conduct an analysis appropriate to a given study design and interpret results.*

Selected Concentration Competencies Addressed:

Each Concentration identifies competencies for each degree offered. The competencies addressed in this course for the DrPH in Leadership, Practice and Research include:
1. Explain qualitative, **quantitative**, mixed methods and policy analysis research and evaluation methods to address health issues at multiple (individual, group, organization, community and population) levels
2. Use statistical computing packages to organize, analyze and report data

Please visit the Concentration webpages on the School of Public Health's website at
sph.rutgers.edu for additional competencies addressed by this course for other degrees and
concentrations.

Course Objectives: By the completion of this course, students will be able to:

- Understand the strengths and weaknesses of randomized trial, observational study, and quasi-experimental study designs.
- Understand the differences between descriptive, causal, and predictive approaches to data analysis.
- Critically review papers for potential sources of bias.
- Apply these concepts correctly using statistical software; and
- Develop the ability to interpret the results of an analysis properly.

Course Requirements and Grading:

You are expected to watch all online content and actively participate in class discussions.

Project: Your final project will be to select a recent journal article in a field that interests you and to describe: the research question, the study population, the variables, potential sources of bias, the models, assumptions, results, interpretation. As part of the project, it will be important to write down their statistical model in detail. The presentation (~10 mins) will summarize the paper, with an emphasis on the statistical aspects. The paper (~2 pages) will summarize the key points mentioned above.

Course evaluation:

1. *Homework (3-4 total)*   *60 pts.*
2. *Project (presentation and paper)*   *30 pts.*
3. *Class Participation (including taking ungraded quizzes)*   *10 pts.*
   Total: *100 pts.*

*Course Schedule (**tentative**)*

Week	Date	Course Topic	Assignments/ Assessments	Link To Competencies And Assessments
1	1/20	overview of course; review (summary stats, data viz, hypothesis testing, CIs)	Ungraded quiz	1,2 (assessed by homework & project)
2	1/27	Intro to R. Table one	In class (ungraded): download data; replicate table one	1,2 (assessed by homework & project)
3	2/3	Intro causal inference, potential outcomes, RCTs	Ungraded quiz	1,2 (assessed by homework & project)
4	2/10	Observational studies emulating RCTs / target trial, confounding	Ungraded quiz	1,2 (assessed by homework & project)

5	2/17	Matching	HW 1 assigned. Due 3/3 Ungraded quiz	1,2 (assessed by homework & project)
6	2/24	Linear regression	Ungraded quiz	1,2 (assessed by homework & project)
7	3/3	Linear regression: interactions and effect modifcation	HW 2 assigned. Due 3/24 Ungraded quiz	1,2 (assessed by homework & project)
8	3/10	Diff-in-diff	Ungraded quiz	1,2 (assessed by homework & project)
	3/17	No class		
9	3/24	Logistic regression	Ungraded quiz	1,2 (assessed by homework & project)
10	3/31	Matching case control and cohort studies; prediction	Ungraded quiz	1,2 (assessed by homework & project)
11	4/7	Survival analysis – censoring; Kaplan Meier	Ungraded quiz	1,2 (assessed by homework & project)
12	4/14	Survival analysis – Cox model	Ungraded quiz	1,2 (assessed by homework & project)
13	4/21	Repeated measures	Ungraded quiz	1,2 (assessed by homework & project)
14	4/28	Missing data	Ungraded quiz	1,2 (assessed by homework & project)
15	5/5	Project presentations		

Grading Policy:

94 – 100	A
90 – <94	A-
87 – <90	B+
84 – <87	B
80 – <84	B-
77 – <80	C+
70 – <77	C
<70	F

Software: R studio is strongly recommended, as I will be demonstrating it in class
https://rstudio.com/

Learning Management System: Canvas will be used extensively throughout the semester for course syllabus, assignments, announcements, communication and/or other course-related activities. It is the student's responsibility to familiarize themselves with Canvas and check it regularly. If you have difficulties accessing Canvas, please inform the instructor and Canvas Support (help@canvas.rutgers.edu). Canvas is accessible at canvas.rutgers.edu.

School of Public Health Honor Code: The School of Public Health Honor Code is found in the School Catalog (sph.rutgers.edu/academics/catalog.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the

writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the School community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Students with Disabilities: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student must apply for Services by first completing a Registration Form with the Rutgers Office of Disability Services (ODS) at ods.rutgers.edu. The student will also be required to participate in an ODS intake interview and provide documentation. If reasonable accommodations are granted, ODS will provide you with a Letter of Accommodations which should be shared with your instructors as early in your courses as possible.

Commitment to Safe Learning Environment: The Rutgers School of Public Health is committed to helping create a safe learning environment for all students and for the School as a whole. Free expression in an academic community is essential to the mission of providing the highest caliber of education possible. The School encourages civil discourse, reasoned thought, sustained discussion, and constructive engagement. Provocative ideas respectfully presented are an expected result. An enlightened academic community, however, connects freedom with responsibility. The School encourages all students to disclose any situations where you may feel unsafe, discriminated against, or harassed. Harassment or discrimination of any kind will be not tolerated and violations may lead to disciplinary actions.

Reporting Discrimination or Harassment: If you experience any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking, know that help and support are available. You may report such incidents to the RBHS Title IX Office or to the School of Public Health's Office of Student Affairs. Rutgers University has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. If you experience any other form of discrimination or harassment, including racial, ethnic, religious, political, or academic, please report any such incidents to the School's Office of Student Affairs. The School strongly encourages all students to report any incidents of discrimination or harassment to the School. Please be aware that all Rutgers employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers as listed in Appendix A to Policy 10.3.12) are required to report information about such discrimination and harassment to the School and potentially the University. For example, if you tell a faculty or staff member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty or staff member must share that information with the RBHS Title IX Coordinator. If you wish to speak to a confidential employee who does not have this reporting responsibility, you can find a list of resources in Appendix A to University Policy 10.3.12. For more information about your options at Rutgers, please visit Rutgers Violence Prevention and Victim Assistance.

Graduate Student Computer Policy: Students are required to possess a personal laptop, no older than approximately two years, that must meet minimum requirements which may be found online at: sph.rutgers.edu/student-life/computer-support.html

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems: When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.

RUTGERS
School of Public Health

Policy Concerning Use of Turnitin: Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com (directly or via learning management system, i.e. Canvas) for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. Students who do not agree should contact the course instructor immediately.

Withdrawal/Refund Schedule: Students who stop attending their course(s) without submitting a completed Add/Drop Course form will receive a failing grade. Furthermore, students dropping to zero credits for the semester are considered withdrawn and must submit a completed Leave of Absence form from the School of Public Health's Office of Student Affairs. The School of Public Health refunds tuition only. Administrative and technology fees are non-refundable. You may find the Withdrawal/Refund Schedule on the School of Public Health website at: sph.rutgers.edu/academics/academic-calendar.html

Special Circumstances During COVID-19 (For Spring 2021)
The School of Public Health recognizes that students may experience challenges or be negatively impacted due to the COVID-19 pandemic, mental and emotional health toll from systemic racism, altered personal and professional obligations, and other crises existing at the moment in our local, national, and global communities. Students are encouraged to discuss these challenges and circumstances with their instructor, if they feel they may need additional support or temporary accommodations at the beginning or during this course. The course instructor may consider making reasonable temporary adjustments depending on the student's situation. If additional support is needed, students may reach out to the Office of Student Affairs (studentaffairs@sph.rutgers.edu) or any of the appropriate referral resources listed on the Student Connect Canvas page.