



EMORY

ROLLINS  
SCHOOL OF  
PUBLIC  
HEALTH

**DEPARTMENT:** Biostatistics and Bioinformatics

**COURSE NUMBER:** BIOS 580      **SECTION NUMBER:** 1

**CREDIT HOURS:** 2.0      **SEMESTER:** Fall 2020

**COURSE TITLE:** Statistical Practice I

**INSTRUCTOR NAME:** Reneé H. Moore, Christina Mehta

**INSTRUCTOR CONTACT INFORMATION**

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SCHOOL ADDRESS: GCR #228, GCR #232

OFFICE HOURS: TBD

**Teaching Assistant(s):** TBD

**COURSE DESCRIPTION**

This course will cover topics dedicated to preparing students to collaborate as biostatisticians for public health and biomedical projects with non-statisticians. Covered topics will include consulting versus collaboration, ethics, nonstatistical aspects of collaboration (e.g. interpersonal communication), and negotiating expectations with clients. The students will work together in small groups to develop research questions based on an existing real life datasets and discussion with clinical collaborator, conduct power analyses, choose the appropriate statistical methodology to analyze the research questions, then answer at least one of the questions, and present the results in both oral and written format. In addition, individually each student will complete a series of milestones that results in oral and/or written proposal for individual capstone project to be completed in the Spring semester.

**TEXTBOOK:** None required.

**SUGGESTED TEXTBOOKS:**

Janice Derr: Statistical Consulting: A Guide to Effective Communication, Duxbury Press, 2000;

Patricia Goodson: Becoming an Academic Writeer: 50 Exercises for Paced, Productive, and Powerful Writing, Sage Publications, 2012.

Gerald van Belle: Statistical Rules of Thumb, 2<sup>nd</sup> edition, Wiley, 2008.

## **MPH/MSPH FOUNDATIONAL COMPETENCIES:**

Evidence-based Approaches to Public Health

2. Select quantitative and qualitative data collection methods appropriate for a given public health context
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
4. Interpret results of data analysis for public health research, policy or practice

Communication

18. Select communication strategies for different audiences and sectors
19. Communicate audience-appropriate public health content, both in writing and through oral presentation

## **BIOSTATISTICS CONCENTRATION COMPETENCIES:**

B<sub>MPH</sub>1: Identify statistical issues in contemporary public health problems.

B<sub>MPH</sub>2: Design clinical and observational studies, including sample size estimation, in collaborative research teams.

B<sub>MPH</sub>4: Apply regression modeling techniques for continuous, categorical, time-to-event, longitudinal and multilevel data.

B<sub>MPH</sub>6: Communicate the results of statistical analyses to a broad audience.

B<sub>MSPH</sub>2: Apply statistical software to implement custom techniques to address unique biomedical or public health problems.

## **COURSE LEARNING OBJECTIVES:**

The primary learning objective is to develop skills necessary to be an effective biostatistics collaborator. Success requires an environment in which the biostatistician is an integral part of all phases of a research project (design, implementation and analysis). Strong communication skills [a mix of tact, persistence, compromise, willingness to listen, and friendly persuasion] are necessary to be successful in consulting and collaboration. Working with experienced biostatisticians and investigators is central to developing the skills necessary to be an effective consultant and collaborator. The course will facilitate students achieving these learning objectives via the following activities:

1. Readings on statistics and ethics (for example the article by Vardeman and Morris) to better appreciate that the discipline of statistics and provide the training necessary to 'deal with data with integrity'. Complete CITI human subjects training.
2. Group Collaboration Project: After introduction of the dataset and broad research goals by a clinical collaborator, students will work in small groups to identify specific research questions, design the statistical analysis plan, conduct the statistical analysis, and present their results.

3. Individual Capstone Proposal Development: Students will meet with several faculty in the Department of Biostatistics and Bioinformatics and at least one clinical collaborator to identify a capstone project to be completed in the Spring semester. Students will provide written reports of the meetings as well as a written and/or oral Capstone Proposal presentation.

## EVALUATION

- Class attendance, participation 20%
- Homework 20%
- Small Group Collaboration Project 30%
- Capstone Proposal Development 30%

## COURSE STRUCTURE

During the weekly class meetings, there will be: presentations to facilitate the primary learning objective of developing skills necessary to be an effective biostatistics collaborator; meetings with clinical investigators to learn about their research and their datasets which will be utilized for the small group collaboration projects; career options in biostatistics; and opportunities to meet with group members and faculty for the small group project and capstone proposal development. There will be homework assignments to reinforce the learning objectives. There also will be assignments throughout the course to facilitate the completion of the small group collaboration project and of the capstone proposal development.

<b>MPH/MSPH Foundational Competencies assessed</b>	<b>Representative Assignment</b>
Select quantitative and qualitative data collection methods appropriate for a given public health context	Homework Assignment will ask about study design including data collection methods for the datasets presented by investigators. Students will address if they would select a different collection method if the study were to be conducted again.
Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	Small Group Collaboration Project will involve quantitative data analysis and utilizing statistical software such as SAS, R
Interpret results of data analysis for public health research, policy or practice	Small Group Collaboration Project will interpret results of data analysis of public health and medical data and translate the statistical results to public health research conclusion
Select communication strategies for different audiences and sectors	Homework and Small Group Collaboration Project will require students to select the appropriate communication strategy to present their results to both statisticians and non-statisticians (public health practitioners, clinicians)
Communicate audience-appropriate public health content, both in writing and through oral presentation	Homework and Small Group Collaboration Project will require students to provide oral and written communication both statisticians and non-statisticians (public health practitioners, clinicians)

<b>BIOS Foundational Competencies assessed</b>	<b>Representative Assignment</b>
Identify statistical issues in contemporary public health problems.	Capstone Proposal Development assignments will incorporate consideration of statistical issues
Design clinical and observational studies, including sample size estimation, in collaborative research teams.	Homework and Small Group Collaboration Project assignments will facilitate students interacting with public health and clinical investigators to design studies to address quantitative research questions and conduct sample size estimation for a future study
Apply regression modeling techniques for continuous, categorical, time-to-event, longitudinal and multilevel data.	Small Group Collaboration Project will require regression modelling
Communicate the results of statistical analyses to a broad audience.	Small Group Collaboration Project results will be communicated to statisticians and non-statisticians
Apply statistical software to implement custom techniques to address unique biomedical or public health problems.	Small Group Collaboration Project will utilize statistical software to address the unique biomedical or public health research questions for each dataset. Individual Capstone Proposal Development will address the statistical software that will be utilized to implement custom techniques to address unique biomedical or public health problems.

## **COURSE POLICIES**

As the instructor of this course I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Equity and Inclusion, 404-727-9877.

## **RSPH POLICIES**

### **Accessibility and Accommodations**

Accessibility Services works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, you must contact the Office of Accessibility Services (OAS). It is the responsibility of the student to register with OAS. Please note that accommodations are not retroactive and that disability accommodations are not provided until an accommodation letter has been processed.

Students who registered with OAS and have a letter outlining their academic accommodations are strongly encouraged to coordinate a meeting time with me to discuss a protocol to implement the accommodations as needed throughout the semester. This meeting should occur as early in the semester as possible.

Contact Accessibility Services for more information at (404) 727-9877 or [accessibility@emory.edu](mailto:accessibility@emory.edu). Additional information is available at the OAS website at <http://equityandinclusion.emory.edu/access/students/index.html>

## **Honor Code**

**You are bound by Emory University's Student Honor and Conduct Code.** RSPH requires that all material submitted by a student fulfilling his or her academic course of study must be the original work of the student. Violations of academic honor include any action by a student

indicating dishonesty or a lack of integrity in academic ethics. *Academic dishonesty refers to cheating, plagiarizing, assisting other students without authorization, lying, tampering, or stealing in performing any academic work, and will not be tolerated under any circumstances.*

The RSPH Honor Code states: “Plagiarism is the act of presenting as one’s own work the expression, words, or ideas of another person whether published or unpublished (including the work of another student). A writer’s work should be regarded as his/her own property.”  
[http://www.sph.emory.edu/cms/current\\_students/enrollment\\_services/honor\\_code.html](http://www.sph.emory.edu/cms/current_students/enrollment_services/honor_code.html)

## COURSE CALENDAR/ COURSE OUTLINE

<b>Week of</b>	<b>Topic</b>
08/26	Introduction, Consulting versus Collaboration
09/02	Nonstatistical aspects of statistical consulting
09/09	Study Design
	Meet the Clinical Investigators and their Data
09/16	Power Calculations
	Meet the Clinical Investigators and their Data
09/23	Best Practices in Programming
	Meet the Clinical Investigators and their Data
09/30	Professional ethics in statistics
10/07	Reading the Biomedical Literature
	Assignments Due: Small Group Research Questions
	Individual Report on Meetings with BIOS faculty
10/14	Statistical Collaboration in academia panel
10/21	Statistical Collaboration in industry and government panel
	Assignment Due: Small Group Power & Sample Size Calculations
10/28	Statistical Collaboration in a DCC
	Assignment Due: Statistical Analysis Plan, Shell Tables/Figures
11/04	Work/Meeting Days
	Assignment Due: Individual Report on Meeting with BIOS Capstone Advisor and Clinical Collaborator
11/11	Work/Meeting Days
11/18	Work/Meeting Days
	Assignment Due: Small Group Summary Statistics (Table 1)
11/25	Work/Meeting Days/ Final Presentations Prep
12/02	Final (Oral and Written) Small Group Report Due
12/09	Individual Capstone Proposal Due

\*This is a tentative course calendar. In addition to the small group and individual capstone proposal assignments listed above, there will be homework assignments assigned throughout the semester to help achieve the primary learning objectives of this course.