



**DEPARTMENT:** Biostatistics and Bioinformatics

**COURSE NUMBER:** 500

**SECTION NUMBER:** 2

**EMORY**

**CREDIT HOURS:** 3

**SEMESTER:** Fall, 2018

**ROLLINS  
SCHOOL OF  
PUBLIC  
HEALTH**

**COURSE TITLE:** Statistical Methods I - GROUP B

**INSTRUCTOR NAME:** *José Binongo*, Ph.D.

## **INSTRUCTOR CONTACT INFORMATION**

EMAIL: [jbinong@emory.edu](mailto:jbinong@emory.edu)

PHONE: (404) 727 9575

SCHOOL ADDRESS OR MAILBOX LOCATION: Rollins School of Public Health  
Emory University  
1518 Clifton Road  
Atlanta, Georgia 30322

**OFFICE HOURS:** Thursday 12:30 pm – 1:30 pm

**Teaching Assistants:** *Xisha Weng* ([xweng3@emory.edu](mailto:xweng3@emory.edu), Tuesday 11:30 am - 1:30 pm), *Ziyue Wu* ([zwu56@emory.edu](mailto:zwu56@emory.edu), Wednesday 3:00 pm - 5:00 pm), *Xiaozhu Zhang* ([xzha477@emory.edu](mailto:xzha477@emory.edu), Monday 1:00 pm – 3:00 pm). Office hours with the teaching assistants will be held in the BIOS library on the 3<sup>rd</sup> floor.

## **COURSE DESCRIPTION**

This course covers fundamental concepts and methods used in data analysis. Upon completion of this course, students will understand and be able to apply basic techniques in descriptive and inferential statistics. These include: techniques in graphical and numerical descriptive statistics; elementary probability calculation using the discrete and continuous distributions; point and confidence interval estimation and hypothesis testing for population means and proportions, differences between means and between proportions; elementary nonparametric techniques, and simple linear regression and correlation. Students will use SAS to perform the statistical analyses.

## **MPH /MSPH/PHD FOUNDATIONAL PUBLIC HEALTH KNOWLEDGE LEARNING OBJECTIVES:**

- Explain the role of quantitative methods and sciences in describing and assessing a population's health

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

- Analyze quantitative data using biostatistics, informatics, computer-based programming and software as appropriate
- Interpret results of data analysis for public health research, policy or practice

## **COURSE LEARNING OBJECTIVES:**

Upon completing this course, students will be able to:

1. Apply the tools of descriptive statistics (both graphical and numerical) to summarize data
2. Employ the techniques of basic inferential statistics (i.e., estimation of population parameters and hypothesis testing) to address research questions of interest involving a continuous or dichotomous outcome
3. Examine the assumptions and limitations of the statistical procedures
4. Use SAS judiciously to perform data analyses

## **COURSE STRUCTURE:**

BIOS 500 is divided into thirteen lectures:

Week 0: Introduction to Data Analysis

Week 1: Descriptive Statistics

Week 2: Probability

Week 3: Discrete Distributions

Week 4: Continuous Distributions

Week 5: Sampling Distributions

Week 6: Confidence Intervals

Week 8: Tests of Hypotheses

Week 9: Two Independent Samples

Week 10: Paired Samples

Week 11: Sample Size & Power

Week 12: Simple Linear Regression

Week 13: Nonparametric Tests

Week 14: Log Transformation

## EVALUATION:

| Assignment                  | Percentage | Due Dates                |
|-----------------------------|------------|--------------------------|
| Weekly Homework Assignments | 30         | Every Tuesday, 2:30 pm   |
| Weekly Quizzes              | 20         | Every Thursday, 11:59 pm |
| Midterm Exam                | 30         | Thursday, Oct 18         |
| Final Exam                  | 20         | Thursday, Dec 13         |
| Total                       | 100        |                          |

### Grading Scale

Students will be assigned a grade based on a 100-point scale. Grades are calculated using the following points for each letter grade:

| Grade | Percentage Range |
|-------|------------------|
| A     | 95 – 100         |
| A-    | 90 – 94          |
| B+    | 85 – 89          |
| B     | 80 – 84          |
| B-    | 76 – 79          |
| C     | 66 – 75          |
| F     | (Below 66)       |

## ASSIGNMENTS & ASSESSMENTS:

### I. Weekly Homework Assignments

The only way to master the concepts taught in this course is by applying them in various situations. The homework problems I assign are chosen to help reinforce the concepts and to prepare you for applying them to real-life data.

### II. Weekly Quizzes

The purpose of the quizzes is to give you feedback on your understanding of the key concepts learned in previous weeks.

### III. Midterm Exam

The Midterm Exam covers everything learned from the first day of the semester. You will be asked to solve problems involving probability concepts. You will also be asked to analyze a data set using the tools they have learned.

### IV. Final Exam

The Final Exam covers everything learned from the first day of the semester; the focus is on the second half of the semester. There is no data analysis portion on this exam.

## ALIGNMENT OF COMPETENCIES, LEARNING OBJECTIVES & ASSESSMENTS:

| MPH/MSPH Foundational Competencies assessed  | Representative Assignment             |
|--|---------------------------------------|
| 1. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming & software, as appropriate             | weekly homework assignments           |
| 2. Interpret results of data analysis for public health research, policy or practice.  | midterm exam                          |
| Course Learning Objectives assessed  | Representative Assignment             |
| 1. apply the tools of descriptive statistics (both graphical and numerical) to summarized data   | weekly homework & quizzes             |
| 2. employ the techniques of basic inferential statistics to address research questions of interest involving a continuous or dichotomous outcome | weekly homework assignments & quizzes |

|  |   |
|--|---|
| 3. examine the assumptions and limitations of the statistical procedures | final exam                                |
| 4. use SAS judiciously to perform data analyses                          | weekly homework assignments, midterm exam |

For course information and updates, regularly check course website on [Canvas](#).

## COURSE POLICIES:

**Textbook:** Weiss, N.A. (2011). Introductory statistics (9th ed.). Boston, MA: Addison Wesley. [ISBN-10: 0321691229 or ISBN-13: 978-0321691224]

**Computer Requirements:** Computer hardware, software, and peripherals compatible with Canvas usage are required. Please note that an iPad or similar mobile device does not provide the needed functionality for all of the Canvas tools. Please consult the Canvas Help site for general information about operating systems, browsers, communication software, and printers. Some courses may require the installation of plugins and/or software which can be installed only by those with administrative rights to their computers. Finally, this course requires the use of SAS on Citrix.

**Lab:** Students must register for one of the three BIOS 500 labs assigned for this lecture. All three labs are full. Switching labs at any time during the semester is not allowed. The Midterm Exam has a lab component which counts towards the lecture grade. If a student switches labs during the Midterm Exam, the student receives a zero.

**Assignments:** A new homework set will be posted every Friday. It is due every Tuesday before class at 2:30 pm. Students must turn in a hardcopy of their homework. Email attachments are not accepted.

You may work together to do the homework problems. However, what you turn in must represent your own understanding of the material. *Students who have an identical response to a homework question will **not** receive credit.*

Some of the assigned problems may not be graded. However, students will be penalized for turning in assignments that are substantially incomplete, even if they completed the graded problems.

For practice, you should attempt as many problems as possible in the textbook, not just the assigned problems. For the non-textbook problems, the answers will be posted on

Canvas after the due date. It is the students' responsibility to check all of their solutions against the answer key to find out where they made mistakes. *Late submissions will not be accepted and will receive a grade of zero.*

If you cannot make it to class on the due date, you may put your homework in my mailbox on the 2nd floor GCR before the due date, and let me know that you have done so. Homework may not be submitted as an email attachment.

**Quizzes:** After you have done the assigned reading and homework for the previous week, take the 10-question multiple-choice quiz on Canvas. You may use your textbook and notes, but your response to the quiz must reflect your own understanding of the concepts learned. *Discussion on the quiz questions is not allowed until after the quiz deadline.*

A new quiz opens every Friday. When you open the quiz, you have until Thursday of the following week to complete it. You can open the quiz multiple times and come back to it as many times as you want. Make sure to save each answer before you exit the quiz. When you are satisfied with your answers, submit the quiz for grading. *When Canvas has graded the quiz, there is no opportunity to redo the quiz, even when the quiz was not completed.* The quiz must be submitted each Thursday at 11:59 p.m. EST.

**Attendance:** Attendance is not mandatory, but there will be no make-up exams.

**Discussion Board:** Please be sure to read other students' posts before posting your question. This will help prevent duplicate posts and duplicate responses. Moreover, please refrain from adding emotional language to your question. When you stay focused on the content of the question, clearly specifying the source of your confusion, I am able to assist you. Emotionally charged statements do not help me in clarifying the confusion. The discussion board is designed to encourage learning and help you synthesize the materials being taught. In this light, you are expected to be respectful of your student peers.

**Presentation:** Communicating effectively in writing and verbally is critical to public health research and practice. MPH graduates are expected to demonstrate these skills in written assignments. Clarity and accuracy are expected in submission of assignments. Keep in mind that spell check and grammar check features of software programs such as Microsoft Word are not sufficient. Please read over all submissions carefully for content, spelling, punctuation, and grammar before turning them in.

BIOS 500 is a course that focuses on interpretation, and it is important that students in their homework or exam learn to provide only relevant information. SAS provides lots of irrelevant output. Points will be taken off when students paste SAS output directly onto their Word document without filtering the output. Students need to demonstrate the ability to process and transform the output into a form that is understood by people who do not take this course.

**Re-grading:** Although every effort will be made to mark your work accurately, sometimes mistakes happen. If you suspect that your work has been graded incorrectly, return the paper to the TA within a week, stating your claim in writing.

The following claims will be considered for re-grading homework assignments, tests and exams: (1) points are not totaled correctly, (2) your answer to a question is essentially correct but stated slightly differently than the grader's expectation.

Considering re-grades takes up valuable time and resources that TAs and the instructor would rather spend helping you understand material. The following claims will not be considered for re-grading: (1) arguments about the number of points lost, (2) arguments about question wording.

**Communicating with the Instructor:** There are two primary modes of communication for this class: the discussion board as well as electronic mail. *Email should be used only for messages that are private in nature.* The instructor will answer questions within 24-48 hours.

**Helpful Hints:** The concepts of this course build upon one another as the course progresses, and to succeed you must master each concept when it is presented. It is thus very important that you *work on the material for this course regularly.* You will probably not learn the material as well as possible if you only study a day or two each week or during the day before an assignment is due.

*Attend all lectures* in order to avoid falling behind. This is a course learned sequentially; it will be difficult to understand new material being presented in class and labs if you fall behind. Many of you work full- or part-time, and your jobs may require you to travel out of town occasionally. Please arrange your schedule in such a way that class and lab absences are kept to a minimum. Get the name and phone number of several students in this class to call if you miss class, to ask questions when you need help, or, better yet, to form study groups. Do not forget to take advantage of the discussion board on the course website. If you miss a lecture, it is your responsibility to catch up with the material before the next class. I do not post on Canvas every announcement I make in the lecture. This is not a distance-learning course. If you have an emergency, notify me as soon as possible.

Out of respect for your classmates, please try to arrive on time for the lectures. If for some reason you must either enter or leave the room during the lecture, please do so as quietly as possible.

*Keep up with the reading assignments and the practice problems.* Not understanding previous material results in not understanding the new material presented. Not understanding the new material means falling even further behind in subsequent weeks. People who get caught in this cycle typically find that they do not really know how to apply the statistical methods to new problems, even if they manage to get

some of the homework problems done.

*Attend all labs* -- they are an integral part of the course. In the lab, you will implement methods learned in class; moreover, you may be introduced to new concepts not covered in the lecture. In the lecture, it will be assumed that you are fully caught up on all lab work. Your ability to use SAS to analyze data will be assessed during the in-class exams.

*Ask questions as soon as they arise.* Three TAs have been assigned to this section. You should, almost always, be able to get help from one of us electronically or in person. When you need help, read the next paragraph. Getting extra help only a day before a test is scheduled is strongly discouraged; plan in advance.

**Extra Help:** Before deciding to see the TAs or me, get your questions answered by posting them on the discussion board on Canvas in the appropriate week folder. Many students will benefit from your question. Please be reminded that the discussion board is designed to encourage learning. In this light, students are expected to be respectful of their peers.

If you need in-office help with class material: (1) Attend the next available TA office hours. Alternatively, (2) email the person you want to see requesting an appointment. Please e-mail at least 24 hours in advance.

**Ongoing Course Feedback:** Although I've taught this course several times before, I regard teaching this course as a pilot and I invite you to participate in it, with me, on that basis. I value your feedback because it tells me how we can improve on what we've been doing and what we need to continue doing. Please feel free to email me constructive feedback. I define constructive feedback as that which I can do something about. Finally, I reserve the right to alter the course content and the pedagogic approach as the course unfolds.

## **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>

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.

**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))

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