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Fall 2017

### BIOS/PUBH 6541 - Biostatistics

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Georgia Southern University  
Jiann-Ping Hsu College of Public Health

## **BIOS/PUBH 6541: Biostatistics**

Fall 2017

**Instructor:** Jingjing Yin

**Office:** Hendricks Hall, Room 1007

**Phone:** 912-478-2413

**Email:** [jyin@georgiasouthern.edu](mailto:jyin@georgiasouthern.edu)

**Class Meeting:** Tuesday and Thursday 12:30pm-2:10 pm,

**Location:** Information Technology Building, Room 2206

**Office Hours:** Monday and Wednesday 9am to 12pm and by appointment via email

TA: Ms. Deborah Kanda. Office hours Thursday 10am to 12pm and she will meet you in the 1<sup>st</sup> floor computer lab or in the lobby of Hendricks Hall.

**Course Description:** This 4 credit course examines statistics in public health and related sciences, including sampling, probability, basic discrete and continuous distributions, descriptive statistics, hypothesis testing, confidence intervals, categorical data analysis, regression, and correlation. Emphasis will be on the development of critical thinking skills and health data analysis applications with computer software.

**Textbook:** Essentials of Biostatistics in Public Health third edition by Lisa M. Sullivan

The lectures will often follow the general organization of the textbook, but with some differences in emphasis and detail. Students will be responsible for **whatever material is covered in the lectures**, whether or not it is treated in the text.

### **Master of Public Health**

#### **MPH**

#### ***Cross-cutting Competencies***

1. Demonstrate effective written and oral skills for communicating with different audiences in the context of professional public health activities.  
(Communication and Informatics)
2. Use information technology to access, evaluate, and interpret public health data. (Communication and Informatics)

3. Describe the roles of history, power, privilege and structural inequality in producing health disparities. (Diversity and Culture)
4. Explain how professional ethics and practices relate to equity and accountability in diverse community settings. (Diversity and Culture)
5. Develop public health programs and strategies responsive to the diverse cultural values and traditions of the communities being served. (Diversity and Culture)

### ***Biostatistics Concentration***

1. Provide the biostatistical components of the design of a public health or biomedical experiment by: clarifying the research objectives or questions; determining data and endpoints to be collected appropriate for the objectives; translating the objectives into biostatistical questions via hypothesis testing or confidence interval frameworks; determining the appropriate sample size; and writing the statistical analysis section of the experiment.
2. Apply appropriate statistical analysis methods using SAS to analyze both categorical and quantitative data.
3. Develop written and oral reports to communicate effectively to research investigators pivotal aspects of a study, including its design, objectives, data, analysis methods, results, and conclusions ensuring that results and conclusions are valid and reliable and address the research objectives.
4. Create a collaborative environment for working on written and oral reports and developing critical thinking skills.
5. Describe key concepts and theory underlying biostatistical methodology used in probability and inferential, analytical, and descriptive statistics.

### **Assessment of Student Learning**

Activity 1: Use course lectures and class discussions to explain the basic terminology and definitions of biostatistics, including but not limited to, fundamental probabilistic notions, properties, and applications to the analysis of public health, biomedical data descriptive statistics, distribution functions, more complex statistics, statistical inference through defining hypotheses to be tested, type I error, type II error, p-value,

proper interpretation of the final results, simple and multiple regression, logistic regression, and survival data analysis. Competence in basic terminology will be evaluated using two activities: (1) weekly homework (2) two equally weighted exams.

Activity 2: Use course lectures, class discussions and class exercises illustrate calculation and interpretation of basic biostatistical measures, including but not limited to, probabilities, descriptive statistics, distribution functions, more complex statistics, statistical inference, estimation and hypotheses testing, type I error, type II error, p-value, simple and multiple regression, logistic regression, and survival data analysis. Competence in biostatistical measures will be evaluated using two activities: (1) weekly homework (2) two equally weighted exams.

Activity 3: Use course lectures, class discussions and real data projects to explain the basic applications of biostatistical principles, as well as the integration of these principles across the public health spectrum. Competence in ability to integrate concepts will be evaluated using final class project using real data.

Activity 4: Competence in written and oral communication to the lay professional audience will be evaluated using final project written report and oral presentation evaluation.

**Assignments and Discussions:** The table below lists assignments for each chapter to be covered throughout the class. You may work together or individually on these assignments, however each student must submit his/her own assignment and state with whom he/she worked, if applicable.

Assignments are to be handed in **by the end of the lecture the day it is due**, unless otherwise announced in class. **Late homework will not be accepted** unless advanced permission was given by the instructor under extraordinary circumstances (e.g., serious illness/accident, death in the family, etc.).

Please describe and justify your answers with detailed reasoning, an answer with merely a final number receives no credit even it is correct. If SAS or R is used, please attach the commented code at the end of the homework, which I should be able to run and reproduce your results.

**I will cheerfully address any homework questions during office hours. Emailing me about specific homework questions is not recommended, but if you do, please allow me one business day to respond.**

**Topics and Schedules:** (subject to change)

<b><i>Date</i></b>	<b><i>Topic</i></b>	<b><i>Readings</i></b>	<b><i>Assignment</i></b>
Week 1	Intro and study design	Chapters 1&2	1,2,3,4,6,7,8,11-14 (multiple choices)
Week 2	Measures for disease	Chapter 3	1, 2, 3, 5,12
Week 3&4	Descriptive methods	Chapter 4	2, 3, 5, 6, 7, 19

Week 5&6	Probability	Chapter 5	1, 2, 3, 6, 7, 11, 13, 16
Week 7	Midterm review and exam	NA	
Week 8&9	Confidence interval Estimation	Chapter 6	1, 3,6,10,11,16
Week 10-12	Hypothesis Testing	Chapter 7	1, 2,3,4,5,6,7,8
Week 13&14	Multivariable methods	Chapter 9	4,5,8,9,10
Week 15	Thanksgiving, no class		
Week 16	Data visualization	Chapter 12	1,2,6,7,10
Time permits	Power and sample size	Chapter 8	TBA

### **Instructional Methods:**

Class meeting will be a combination of lecture, class discussion and active participation.

PowerPoint presentations (you can find and download from Folio) will be used in the lecture portion of this course. Prior to each lecture, the student is encouraged to complete the recommended reading and actively participate in the class discussion. In this way, it is hoped that the learner will be better prepared to successfully accomplish the learning objective of each lecture experience.

### **Grading Scheme:**

Homework: 40%

Midterm: 30%

Final Exam: 30%

### **Grading Scale:**

A 90 - 100%

B 80 - 89%

C 70 - 79%

D 60 - 69%

F 0 - 59%

### **Approximate Schedule of in Class Exams:**

**MIDTERM:** week 11 (cover chapters 1 to 6)

**FINAL EXAM:** Final exam week

**NO make-ups for any missed exam**

**Academic Integrity:** Students are expected to follow guidelines outlined in the *Student Conduct Code* policy regarding academic dishonesty. Any student found in violation of academic honesty will receive a grade of 'F' for the course. It is the student's responsibility to familiarize him/herself with the student policies and expectations set forth in the *GSU Student Conduct Code*

**Attendance Policy:** Due to the nature and structure of this course, class attendance is of utmost importance. You are responsible for any material covered or distributed in class, including any announcements made in class, whether or not you are present. Furthermore, federal regulations require attendance be verified prior to distribution of financial aid allotments. Attendance will not be recorded after this initial period. However, if you are going to miss one class, it is recommended that you notify the instructor prior to the start of the class so that I could help you to make up for the lecture you have missed.

**Class Participation & Etiquette:** Attendance, attention, and participation are expected for each class! Note that although class participation is not a formal part of your course grade, I will use it as a factor if your final grade is on the border between two letter grades.

On a final note of etiquette, please do not text or use your cell phones during class, and silent your cell phones since ring tones are disruptive to others. If you have to use the cell phone, you may leave the classroom so that you do not interrupt others. And please do not chat or make noises while the instructor or your classmate is talking.

**Disclaimer:** The contents of this syllabus are as complete and accurate as possible. The instructor reserves the right to make any changes necessary to the syllabus and course material. The instructor will make every effort to inform you of changes as they occur. It is the responsibility of the student to know what changes have been made in order to successfully complete the requirements of the course.

### **Plagiarism**

"According to the Academic Dishonesty Policy of GSU, Plagiarism includes (but is not limited to):

- A. Directly quoting the words of others without using quotation marks or indented format to identify them.
- B. Using published or unpublished sources of information without identifying them.
- C. Paraphrasing material or ideas without identifying the source.
- D. Unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic material.

If you are accused of plagiarism by a JPHCOPH, the following policy, as per the Judicial Affairs website ( <http://students.georgiasouthern.edu/judicial/faculty.htm> ) will be enforced:

## **PROCEDURES FOR ADJUDICATING ACADEMIC DISHONESTY CASES**

### **First Offense - In Violation Plea**

1. If the professor and the Dean of Students agree that the evidence is sufficient to warrant a charge of academic dishonesty, the professor should contact the Office of Judicial Affairs to determine if this is a first violation of academic dishonesty. The incident will be reported via the following website:

<http://students.georgiasouthern.edu/judicial/faculty.htm>

2. If it is a first violation, the professor should talk with the student about the violation. If the student accepts responsibility in writing and the professor decides to adjudicate the case, the following procedures will be followed:

a. The student will be placed on disciplinary probation for a minimum of one semester by the Office of Judicial Affairs.

b. The student will be subject to any academic sanctions imposed by the professor (from receiving a 0 on the assignment to receiving a failing grade in the class).

c. A copy of all the material involved in the case (Academic Dishonesty Report Form and the Request For Instructor to Adjudicate Form) and a brief statement from the professor concerning the facts of the case and the course syllabus should be mailed to the Office of Judicial Affairs for inclusion in the student's discipline record.

### **First Offense - Not In Violation Plea (student does not admit the violation)**

If the professor and the Dean of Students agree that the evidence is sufficient to warrant a charge of academic dishonesty, the professor should contact the Office of Judicial Affairs to determine if this is the first or second violation of academic dishonesty. The student will be charged with academic dishonesty and the University Judicial Board or a University Hearing Officer would hear the case. If the student is found responsible, the following penalty will normally be imposed:

a. The student will be placed on Disciplinary Probation for a minimum of one semester by the Office of Judicial Affairs.

b. The student will be subject to any academic sanctions imposed by the professor.

### **Second Violation of Academic Dishonesty**

If the professor and the Dean of Students agree that the evidence is sufficient to warrant a charge of academic dishonesty, and if it is determined this is the second violation, the student will be charged with academic dishonesty and the University Judicial Board or a University Hearing Officer would hear the case.

If the student is found responsible, the following penalty will normally be imposed:

a. Suspension for a minimum of one semester or expulsion.

b. The student will be subject to any academic sanctions imposed by the professor.

### **NOT RESPONSIBLE FINDING**

When a student is found not responsible of academic dishonesty, the work in question (assignment, paper, test, etc.) would be forwarded to the Department Chair. It is the responsibility of the

Department Chair to ensure that the work is evaluated by a faculty member other than the individual who brought the charge and, if necessary, submit a final grade to the Registrar. For the protection of the faculty member and the student, the work in question should not be referred back to the faculty member who charged the student with academic dishonesty.

In the case of a Department Chair bringing charges against a student, an administrator at the Dean's level will ensure that the student's work is evaluated in an appropriate manner.

**CONFIDENTIALITY**

In accordance with provisions of the Family Educational Rights and Privacy Act of 1974 and the Georgia Open Records Act, any information related to a violation of academic dishonesty or the outcome of a judicial hearing regarding academic dishonesty, is prohibited and must be treated as confidential by members of the faculty."