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BIOS/PUBH 6541: Biostatistics

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Georgia Southern University
Jiann-Ping Hsu College of Public Health

BIOS/PUBH 6541: Biostatistics

Fall 2019

Instructor: Xinyan Zhang

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Fax: 912.478.0171

Location: 1008 Hendricks Hall

Office Hours: Wednesday and Thursdays 9:30 – 12:00 AM; and by appointment

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

Location: Education Bldg - Room 1125

TA: Ms. Kavita Gohil. Office hours Wednesday 2pm to 4pm and she will meet you in the 1st floor computer lab or in the lobby of Hendricks Hall.

Course Catalog available at:

<http://em.georgiasouthern.edu/registrar/resources/catalogs/>
under Jiann-Ping Hsu College of Public Health Programs

Prerequisites: N/A

FOLIO Access: <https://my.georgiasouthern.edu/portal/portal.php>

Access to course materials are available for up to one year after graduation.

Catalog 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.

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

MPH Core Student Learning Outcomes

1. Select quantitative and quantitative data collection methods appropriate for a give public health context (#2)

2. Analyze and Interpret data for public health research, policy, or practice (#4, edited)
3. Assess population needs, assets, and capacities that affect communities' health (#7)
3. Design a population-based policy, program, project or intervention (#9)
4. Communicate audience-appropriate public health content, both in writing and through oral presentation (#19)

CEPH Concentration Competencies

1. Provide the biostatistical components of the design of a public health or biomedical experiment.
2. Demonstrate proficiency in SAS programming to solve biomedical problems.
3. Develop expertise and demonstrate the cognition of ethical issue in biomedical studies, such as treatment efficacy and patient safety.
4. Translate the biomedical experimental objectives into biostatistical questions via hypothesis testing or confidence interval framework.
5. Describe key concepts and theory underlying biostatistical methodology used in probability and inferential, analytical and descriptive statistics.

CEPH MPH Competencies

Evidence-based Approaches to Public Health

1. Apply epidemiological methods to the breadth of settings and situations in public health practice
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

Public Health & Health Care Systems

5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings
6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels

Planning & Management to Promote Health

7. Assess population needs, assets and capacities that affect communities' health
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs
9. Design a population-based policy, program, project or intervention
10. Explain basic principles and tools of budget and resource management
11. Select methods to evaluate public health programs

Policy in Public Health

12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence
13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes
14. Advocate for political, social or economic policies and programs that will improve health in diverse populations
15. Evaluate policies for their impact on public health and health equity

Leadership

16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making
17. Apply negotiation and mediation skills to address organizational or community challenges

Communication

18. Select communication strategies for different audiences and sectors
19. Communicate audience-appropriate public health content, both in writing and through oral presentation
20. Describe the importance of cultural competence in communicating public health content

Interprofessional Practice

21. Perform effectively on interprofessional teams

Systems Thinking

22. Apply systems thinking tools to a public health issue

Performance-Based Objectives Linked to Course Activities (Note: Assessment Activities Described in Next Section)

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.

Students may vary in their ability to achieve levels of competence in this course. Students can expect to achieve course competence only if they honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of them as students.

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.

Overview of the content to be covered the semester:

Date	Topic	Readings	Assessments
Week 1	Intro and study design	Chapters 1&2	Individual Assignment 1: Chapter 2: 1,2,3,4,6,7,11-14 (multiple choices)
Week 2	Measures for disease	Chapter 3	Individual Assignment 2: 1, 2, 3, 5,12
Week 3&4	Descriptive methods	Chapter 4	Individual Assignment 3: 2, 3, 5, 6, 7, 19
Week 5&6	Probability	Chapter 5	Individual Assignment 4: 1, 2, 3, 6, 7, 11, 13, 16
Week 7&8	Confidence interval Estimation	Chapter 6	Individual Assignment 5: 1, 3,6,10,11,16
Week 9	Midterm review and exam	NA	
Week 10-12	Hypothesis Testing	Chapter 7	Individual Assignment 6: 1, 2,3,4,5,6,7,8

Week 13&14	Multivariable methods	Chapter 9	Individual Assignment 7: 4,5,8,9,10
Week 15	Thanksgiving, no class		
Week 16	Data visualization	Chapter 12	Individual Assignment 8: 1,2,6,7,10
Time permits	Power and sample size	Chapter 8	TBA

Portfolio Inclusion

Samples of your work may be reproduced for search purposes and/or inclusion in the professor's teaching portfolio. You have the right to review anything selected for use, and subsequently ask for its removal.

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

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 9 (cover chapters 1 to 6)

FINAL EXAM: Final exam week

NO make-ups for any missed exam

General Expectations

1. For every one-credit hour, you should expect to work roughly two hours outside the classroom each week. For example, for a three credit hour course, during a regular fifteen week semester, you should expect approximately ninety hours of work outside of class.
2. Students are expected to keep up with the class, to read the required material, and to submit assignments and activities by due dates and times.
3. Students are expected to independently complete all activities, exercises, assignments, and assessments including exams.
4. Students are expected to produce quality work. Typos and grammar errors should be kept to a minimum. The format and readability of submissions will be taken into consideration when assigning a grade.
5. Remember to check when assignments are due. It is recommended that you stay ahead of schedule on the assignments, so if an emergency happens, your assignment will be completed and ready to submit within the designated time frame. It is your responsibility to keep track of the due dates for each assignment.

Response Times

During a normal work week (i.e., Monday 9:00 AM through Friday 5:00 PM) students can expect responses as follows:

- Email: within 48 hours
- Discussion posts: within 72 hours
- Assignment grades: within 72 hours of submission date.

Exceptions: I may not check FOLIO or GSU email over the weekends. If you send me an email after 5:00 PM on Friday, please do not expect a response until the following Monday.

All assignments will be graded promptly so that students may accurately calculate their grades at any point in time during the semester. There are times when extraordinary circumstances occur (e.g., serious illness, death in the family, etc.). In such circumstances, and/or if you need additional time to satisfactorily complete any course requirement, please consult with the instructor within a reasonable amount of time. Extensions are not guaranteed and will be granted solely at the discretion of the instructor.

Texting and Use of Cell Phones (and Other Technologies)

Please do not text in class or use your cell phone during class! Texting during class (or in a meeting) is disruptive and rude...at least to me. My preference is that you put cell phones away during class meetings so they are not a source of temptation. Offenders will be asked to leave.

Class Attendance and Participation Policy

Federal regulations require attendance be verified prior to distribution of financial aid allotments. Regular attendance is expected. Your attendance will be verified at the first regular class session.

It is the policy of the University to permit students, faculty, and staff to observe those holidays set aside by their chosen religious faith. The faculty should be sensitive to the observance of these holidays so that students who choose to observe these holidays are not seriously disadvantaged. It is the responsibility of those who wish to be absent to make arrangements in advance with their instructors.

Students participating in authorized activities as an official representative of the University (i.e., athletic events, delegate to regional or national meetings or conferences, participation in university-sponsored performances, and **JPHCOPH funded**) will not receive academic penalties and, in consultation with the instructor of record, will be given reasonable opportunities to complete assignments and exams or given compensatory assignment(s) if needed. The student must provide written confirmation from a faculty or staff advisor to the course instructor(s) at least 10 days prior to the date for which the student will be absent from the class. The student is responsible for all material presented in class and for all announcements and assignments. When possible, students are expected to complete these assignments before their absences. In the event of a disagreement regarding this policy, an appeal may be made by either the student or the instructor of record to the corresponding college dean. (*University Graduate Catalog*)

Academic Misconduct

As a student registered at this University, it is expected that you will adhere to only the strictest standards of conduct. It is recommended that you review the latest edition of the *Student Conduct Code* book, as well as the latest *Undergraduate & Graduate Catalog* to familiarize yourself with the University's policies in this regard. Your continued enrollment in this course is an implied contract between you and the instructor on this issue; from this point forward, it is assumed that you will conduct yourself appropriately.

Plagiarism

According to the Academic Dishonesty Policy of Georgia Southern University, 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 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."

Accommodations for Individuals with Disabilities

In compliance with the Americans with Disabilities Act (ADA), Georgia Southern University will honor requests for reasonable accommodations made by individuals with disabilities. Students must self disclose any disability for which an accommodation is being sought to the Student Disability Resource Center (SDRC) before academic or other accommodations can be implemented. For additional information, please call the Director of EEO and Title IX at (912) 478-5136 / TDD (912) 478-0273 or the SDRC Director at (912) 478-1566 / TDD (912) 478-0666. The TDD phone numbers are intended for individuals with hearing impairments.

University Calendar for the Semester

The University Calendar is located with the semester schedule, and can be found at: <http://em.georgiasouthern.edu/registrar/resources/calendars/>

One Final Note

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 to ensure better student learning. The instructor will announce any such changes in class. It is the responsibility of the student to know what changes have been made in order to successfully complete the requirements of the course.

This syllabus, my lecture notes, and all materials distributed and presented during this course are protected by copyright law. You are authorized to take notes in this class but that authorization extends to only making one set of notes for your personal use and no other use. You are not authorized to sell, license, commercially publish, distribute, transmit, display, or record notes from this class unless you have my written consent to do so.

STUDENT CONDUCT CODE

The Student Conduct Code is the official University publication governing student conduct and behavior. It is the responsibility of each student to become familiar with the rules and regulations governing student life. Student conduct procedures, appeal procedures, and disciplinary sanctions are found in the Student Conduct Code at <http://students.georgiasouthern.edu/conduct>. I acknowledge that I have read and understand this statement referencing the Student Conduct Code.

ACADEMIC DISHONESTY

The University goal is to foster an intellectual atmosphere that produces educated, literate people. Because cheating and plagiarism are at odds with that goal, they shall not be tolerated in any form. Students are expected to adhere to the rules and regulations as set forth in the Student Conduct Code. Therefore, all work submitted by a student must represent that student's own ideas and effort; when the work does not, the student has engaged in academic dishonesty. Plagiarism occurs when a person passes in another person's work as his or her own, borrows directly from another person's work without proper documentation, and resubmits his or her own work that has been previously submitted without explicit approval from the instructor. For example, academic dishonesty occurs whenever a student participates in any of the following: Cheating submitting material that is not yours as part of your course performance; using information or devices that are not allowed by the faculty; obtaining and/or using unauthorized materials; fabricating information, research, and/or results; violating procedures prescribed to protect the integrity of an assignment, test, or other evaluation; collaborating with others on assignments without the faculty's consent; cooperating with and/or helping another student to cheat; demonstrating any other forms of dishonest behavior. Plagiarism directly quoting the words of others without using quotation marks or indented format to identify them; using sources of information (published or unpublished) without identifying them; paraphrasing materials or ideas without identifying the source; self-plagiarism - resubmitting work previously submitted without explicit approval from the instructor; unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic material. NOTICE: The list above is intended only to provide general guidelines for recognizing and avoiding common types of academic dishonesty. It is in no way an exhaustive or comprehensive list of all the types of academic dishonesty. For more information about academic honesty, see the Student Conduct Code at <http://students.georgiasouthern.edu/conduct>. I acknowledge that I have read and understand the Academic Dishonesty Policy.

I have read the syllabus and understand the contents and course requirements.

Student Name (print)

Student Signature

Date