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PUBH 7890 Individual Study: Simulation and Analysis in R

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Individual study: Simulation and analysis in R
Spring 2017

Instructor: Jingjing Yin
Office: Hendricks Hall, Room 1007
Phone: 912-478-2413
Email: jyin@georgiasouthern.edu
Class Meeting: Wednesday 11am-12pm
Location: Hendricks Hall, Room 1007
Office Hours: Monday and Wednesday 9am - 12pm

Course Description: This course introduces R and its applications in biomedical and social media data analysis as well as in statistical simulation. The students will learn how to apply R as a statistical analysis tool using existing R packages and interpret the results of analysis. Students will learn to use R for social media data analysis in public health, primarily Twitter data. In addition to apply existing R packages and functions, students will learn how to perform statistical simulation for methodological research, primarily simulation in medical diagnostics. Emphasis will also be placed on the development of critical thinking skills.

Textbook: No required Textbook. For intro and basic data analysis, lectures will follow the listed link below and extend as necessary

<http://www.ats.ucla.edu/stat/r/seminars/intro.htm>

For simulation and more advanced data mining lectures, instructor will provide reading materials (research papers and R package documents) and some lectures are based on the following links

R simulation

<https://www.youtube.com/watch?v=tvv4IA8PEzw>

R function

<https://www.youtube.com/watch?v=KIqlKw2zqEQ>

<https://www.youtube.com/watch?v=gl9opYcRxO8>

http://gastonsanchez.com/Handling_and_Processing_Strings_in_R.pdf

https://github.com/chainsawriot/hkrug_tm/blob/master/notes.md

Apply()

<https://www.youtube.com/watch?v=WuCVs3bW-ZY>

Required Resource: Students are required to bring their own laptop computers. They are requested to install R, RStudio and Tinn-R in their computers. All three are free software.

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: data analysis project 1

Activity 2: statistical simulation project 2

Activity 3: R lab assignments 1-8 (in class and take home)

Topics and Schedules: (subject to change)

Chapter	Topic	Assignments
Week 1	Intro to R	
Week 2	Basic data analysis	R lab 1
Week 3	Intro to statistical simulation in R	R lab 2
Week 4	Intro to Medical diagnostic (1)	
Week 5	Simulations in medical diagnostics (1)	R lab 3
Week 6	Intro to Medical diagnostic (2)	
Week 7	Simulations in medical diagnostics (2)	R lab 4
Week 8	Statistical simulation project presentation	
Week 9	Statistical simulation project follow-up	Project 1
Week 10	Spring break, no class	
Week 11	Introduction to string processing in R	R lab 5
Week 12	Web Data Collection	R lab 6

Week 13	Text Mining (1)	R lab 7
Week 14	Text Mining (2)	R lab 8
Week 15	Text Mining project presentation	
Week 16	Text Mining project follow-up	Project 2

Grading Scheme:

Project 1: 40%

Project 2: 40%

Assignments: 20%

Grading Scale:

A 90 - 100%

B 80 - 89%

C 70 - 79%

D 60 - 69%

F 0 - 59%

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."