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Fall 2017

BIOS XXXX - Measurement Error in Survival Analysis

Lili Yu

Georgia Southern University, Jiann-Ping Hsu College of Public Health, lyu@georgiasouthern.edu

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Georgia Southern University
Jiann-Ping Hsu College of Public Health

BIOS XXXX– Measurement Error in Survival Analysis
Fall 2017

Instructor: Dr. Lili Yu
Office: Hendricks Hall 1010
Phone: 912.478.1278
Email: lyu@georgiasouthern.edu
Fax: 912.478.5811
Website: Folio
Grading Assistant:
Time:
Location:
Office Hours:

Prerequisites: BIOS 6131, BIOS 6531 and BIOS 7131

Course Description: This course will be placed on the measurement error of the covariates in survival data. Common methods for measurement error of the covariates in linear, nonlinear (including survival) models will be introduced. They are regression calibration, simulation extrapolation, score function methods, Bayesian methods, etc. The students will learn how to use R language to setup survival dataset and perform analysis for survival data with measurement error.

Required Textbook:

1. Ratnibd J. Carroll, David Ruppert, Leonard A. Stefanski and Ciprian M. Crainiceanu. (2006). *Measurement Error in Nonlinear Models*. Second Edition. Chapman & Hall/CRC. ISBN: 1-58488-633-1.

DRPH Student Learning Outcomes (CORE)

1. Demonstrate their readiness to work with communities to address public health problems.
2. Select and apply theoretically based interventions to address public health problems.
3. Apply appropriate research methods to address community health problems, particularly among rural and underserved populations.

DRPH Biostatistics Student Learning Outcomes (BIOS)

1. Construct a public health and biomedical research question from ideas, conditions, and events that exist in a rural and urban community, region, state, and nation using critical thinking skills.
2. Demonstrate required skills for translating public health practice objectives to the appropriate biostatistical framework for analysis and interpretation of results.
3. Illustrate sufficient substantive knowledge of advanced biostatistical methods such as multiple regression, logistic regression, survival analysis, longitudinal data analysis, and Bayesian and adaptive methods to interact with biostatisticians and related public health researchers in a meaningful and productive fashion.
4. Communicate biostatistical principles and concepts to lay and professional audiences through both oral and written communication.

DrPH Concentration Competencies in Biostatistics

1. Design a public health and biomedical investigation in terms of the experimental design, data to be collected that reflect research objectives, number of subjects needed, and specification of appropriate methods for analysis.
2. Analyze public health and biomedical data using appropriate statistical software such as SAS, R and S-plus.
3. Interpret analytic methods used in the public health and biomedical journals, as well as critique published reports of public health and biomedical experiments as to the validity of the inferential conclusions.
4. Develop new biostatistical methods and new ideas for applying existing biostatistical methods to applications in public health and the biomedical sciences.
5. Develop written and oral reports to communicate effectively with research investigators the pivotal aspects of a study, including: design, study objectives, data analysis methodology, results and conclusions.
6. Create a collaborative environment for working on written and oral reports

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

1. Distinguish survival type data from other data types; (Activity 1,2,3,4)
2. Distinguish different types of measurement error of the covariates; (Activity 1,2,3,4)
3. Understand common methods for measurement error: regression calibration, simulation extrapolation, score function methods, Bayesian methods; (Activity 1,2,3,4)
4. Understand likelihood method and quasi-likelihood method; (Activity 1,2,3,4)
5. Understand current methods for measurement error in survival data; (Activity 1,2,3,4)

Assessment of Student Learning

Activity 1: presentation

Activity 2: project

Grading Scheme: Weighting of assignments for purposes of grading will be as follows:

Presentation (50%)

Project (50%)

Grading Scale: The following point scale will be utilized in grading:

(70%-100%) Satisfy

(70% below) Not Satisfy

Your grades ***will not*** be posted. 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. *Nota Bene:* Extensions are not guaranteed and will be granted solely at the discretion of the instructor.

Overview of the Content to be Covered During the Semester:

Week	Topic	Readings	Assignment
1	Introduction	Chapter 1:	
2-3	Important concepts	Chapter 2 and 3:	TBA
4-5	Regression calibration, simulation extrapolation	Chapter 4 and 5:	TBA
6-8	Instrumental variables, score function methods, likelihood	Chapter 5-7 :	TBA
9-10	Bayesian methods and nonparametric estimation	Chapter 9 and 12:	TBA
11-12	Semiparametric regression, survival data	Chapter 13 and 14:	TBA
13-14	R code		TBA

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 meetings will be a combination of class discussion, presentation, and computer software demonstration. Presentations and projects constitute the basis of student evaluation.

Exam Schedule and Final Examination:

No exams.

Academic Misconduct: "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 students 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 Deans level will ensure that the students work is evaluated in an appropriate manner.

Academic Handbook:

Students are expected to abide by the Academic Handbook, located at <http://students.georgiasouthern.edu/sta/guide/>. Your failure to comply with any part of this Handbook may be a violation and thus, you may receive an F in the course and/or be referred for disciplinary action.

University Calendar for the Semester:

The University Calendar is located with the semester schedule, and can be found at: <http://www.collegesource.org/displayinfo/catalink.asp>.

Attendance Policy:

Federal regulations require attendance be verified prior to distribution of financial aid allotments. Attendance will not be recorded after this initial period.

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. The instructor will make every effort to inform students 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.