DEPARTMENT: Biostatistics and Bioinformatics

COURSE NUMBER: BIOS 521 **SECTION NUMBER:** 1

CREDIT HOURS: 2 **SEMESTER:** Fall 2020

COURSE TITLE: Applied Survival Analysis

CLASS HOURS AND LOCATION: TBD

INSTRUCTOR NAME: Amita Manatunga

INSTRUCTOR CONTACT INFORMATION

Teaching Assistant(s): TBD

COURSE DESCRIPTION

This course will provide an introduction to statistical concepts and methods related to the analysis of survival data. Topics include survival functions, hazard rates, types of censoring and truncation, life table, log-rank tests, Cox regression models, and parametric regression models. The emphasis is on practical implementation of standard survival analysis methods using SAS or R and results interpretations.

MPH/MSPH FOUNDATIONAL COMPETENCIES:

F3 – Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate

F4 – Interpret results of data analysis for public health research, policy and practice

CONCENTRATION COMPETENCIES:

$B_{MPH}2$: Design clinical and observational studies, including sample size estimation, in collaborative research teams.

$B_{MPH}3$: Use statistical software for data management and exploratory data analysis.

$B_{MPH}4$: Apply regression modeling techniques for continuous, categorical, time-to-event, longitudinal and multilevel data.

COURSE LEARNING OBJECTIVES:

Upon successfully completing this course, students should be able to use standard and advanced statistical techniques to analyze survival data arising in various biomedical applications.

EVALUATION

Homework assignments --- 30 %
Participation 10%
Midterm data analysis project --- 30%
Final data analysis project --- 30%

Students are encouraged to discuss homework problems and work with each other. The final write-ups must be independent work and are due at the start of class on the due date.

Two take-home independent data analysis projects will be assigned. Evaluation is based on a written report which will consist of sections on motivation/goals, data description, analytic approach, analysis results, and discussion. Biostatistics students may be responsible for additional methodological questions

COURSE STRUCTURE

MPH/MSPH Foundational Competency assessed	Representative Assignment
Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	Homework assignments and exams will involve analysis of real data sets
Interpret results of data analysis for public health research, policy or practice	Homework assignments and exams will involve interpretation of results from exploratory analyses and regression modeling.
BIOS Concentration Competencies assessed	**Representative Assignment**
Design clinical and observational studies, including sample size estimation, in collaborative research teams.	One homework assignment will cover power and sample size calculation.
Use statistical software for data management and exploratory data analysis.	Homework assignments and exams will require programming in R or a similar language.

Apply regression modeling techniques for continuous, categorical, time-to-event, longitudinal and multilevel data.	Data analysis projects will require students to apply regression modeling techniques for time-to-event data.

COURSE POLICIES

Students are expected to attend lectures and ask questions during class.

The course will use the textbook Modelling Survival Data in Medical Research (3rd Edition) by Collet with supplemental journal article readings.

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.

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. Additional information is available at the OAS website at http://equityandinclusion.emory.edu/access/students/index.html

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)

COURSE CALENDAR and OUTLINE

Below is a tentative list of topics and schedule.

- Survival data, censoring and truncation
- Life tables
- Survival and hazard functions
- Log-rank tests
- Cox proportional hazard (CPH) models
- CPH building and diagnostics
- Sample size and power calculations
- Parametric survival models
- Frailty models
- Time-varying covariates