DEPARTMENT: Biostatistics and Bioinformatics

COURSE NUMBER: Bios522   **SECTION NUMBER:**

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

COURSE TITLE: Survival Analysis Methods

CLASS HOURS AND LOCATION:

INSTRUCTOR NAME: Amita Manatunga

INSTRUCTOR CONTACT INFORMATION

EMAIL:amanatu@emory.edu

PHONE 404-727-1309

SCHOOL ADDRESS OR MAILBOX LOCATION: GCR364

OFFICE HOURS: Amita Manatunga, ,GCR364, Friday 10:00–11:00 AM or by appointment

COURSE DESCRIPTION

This course aims to develop basic understanding of statistical concepts and methods related to the analysis of survival data. The concepts to be introduced include survival functions, hazard rates, types of censoring and truncation. Methods of focus are life table, Kaplan-Meier and Nelson-Aalen estimates, log-rank tests, Cox regression. models, and parametric regression models. Students will learn how to implement standard survival analysis methods using SAS or R and appropriately interpret results Examples and homework assignments based on real life data will give students the opportunity to analyze survival data and produce reports of their methods, results and conclusions

MPH/MSPH FOUNDATIONAL COMPETENCIES:

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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:

B4 – Collaborate with investigators and statistical colleagues in the analysis of data from biomedical and public health studies

B5 - Communicate the results of statistical analyses to a broad audience

$B_{MSPH}2$ - Use statistical software for both data management and data analysis, including coding of custom techniques

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 real-life applications

EVALUATION

Homework (assigned after each class) --- 35%
Mid-term exam --- 30%
Final exam (comprehensive) --- 35%

COURSE STRUCTURE

Class will meet for two consecutive 50-minutes sessions once a week. Students are expected to attend each class and participate in class discussions. Homework questions will be assigned at the end of each class and solutions must be turned in at the beginning of the next class. Each question will be graded separately, and the overall homework score will be based on the average of the grades of all the questions. The mid-term and final exams will be in-class exams.

Each of the MPH/MSPH and the concentration competencies listed above is related to each of the three evaluation criteria.

COURSE POLICIES

Course policies are listed under 'Course structure' above. Students should have access to the following textbook and dataset.:

Klein, J. P. and Moeschberger, M. Survival Analysis Techniques for Censored and Truncated Data, 2nd Ed., Springer-Verlag, 2003.

Link for data sets:
https://www.mcw.edu/departments/biostatistics/statistical-resources (under the Survival Analysis Techniques for Censored and Truncated Data column).

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

<u>Accessibility and Accommodations</u>

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

Date	Topics	Evaluations
Tuesday 9/4	Overview of Regression with continuous and binary outcome	
Tuesday 9/11	Survival Analysis Methods Introduction to Survival Problems, Data	
Tuesday 9/18	Introduction to survival problems (Chapter 1); Basic quantities (Sections 2.1–2.4)	HW 1 given
Tuesday 9/25	Common models for survival data (Sections 2.5–2.6); Censoring and truncation; Likelihood construction (Section 3.1–3.5)	HW 1 due, HW 2 given
Tuesday 10/2	Nonparametric estimation of basic quantities I (Sections 4.1–4.4)	HW 2 doe, HW 3 given
10/9	Spring Break	
Tuesday 10/16	Mid Term Examination	
Tuesday 10/23	Nonparametric estimation of basic quantities II (Sections 4.5–4.6; Chapter 5)	HW 3 due, HW 4 given
Tuesday 10/30	Hypothesis testing I (Sections 7.1–7.4)	HW 4 due, HW 5 given
Tuesday 11/	Hypothesis testing II (Sections 7.5–7.8); Sample size and power calculations	HW 5 due, HW 6 given
Tuesday 10/30	Cox proportional hazards model I (Sections 8.1–8.4)	HW 6 due, HW 7 given
Tuesday 11/6	Cox proportional hazards model II; Model building (Sections 8.5–8.8)	HW 7 due, HW 8 given
Tuesday 11/13	Refinement of the Cox regression (Chapter 9)	HW 8 due, HW 9 given
Tuesday 11/20	Diagnostics of the Cox regression model (Sections 11.1– 11.6)	HW 9 due, HW 10 given
Tuesday 11/27	Inferences for parametric regression models (Chapter 12)	HW 10 due, HW 11 given
Tuesday 12/4	Sample Size and Power	HW 11 due,
12/11	Review; Report Writing	

COURSE OUTLINE

Please see Course Calendar