Course #: STAT 5370
(CRN 26418)
Course Title: Special Topics – Survival Analysis
Credit Hrs: 3
Term: Spring 2014 (Instruction 01/21/2014 – 05/08/2014)
Course Meetings & Location: TBA
1:30-2:50pm TR
Prerequisite Courses: Linear models and generalized linear models; Some programming experiences would be plus, though not required.
Instructor: Xiaogang Su
Office Location: Bell Hall 320
Contact Info: Phone: (915) 747-6860 [O]
xsu@utep.edu
Fax: (915) 744-6502
Office Hours: 3:00-4:00pm TR
Class Web page: https://sites.google.com/site/xgsu00/home/stat-5370-survival-analysis
Textbook(s), Materials:
Course Description and Learning Outcomes: In generalized linear models, we have learned how logistic regression is used to analyze the prevalence rate of some interesting event such as death of a patient, failure of a machine, delinquency of a credit card holder, churn of a cell phone users, etc. Survival analysis provides further insight into the progression into this event of interest. Specifically, survival analysis is an important subfield of statistics which deals with analysis of time to event data. Survival analysis helps to address questions such as: what is the proportion of a population which will survive past a certain time? Of those that survive, at what rate will they die or fail? Can multiple causes of death or failure be taken into account? How do particular circumstances or characteristics increase or decrease the probability of survival? Censoring is the most important feature that characterizes and complicates survival analysis.
This course will provide a coverage of topics and methodologies common in survival analysis. Students will have opportunities to gain hands-on experiences with real-world data projects.
Topic Outline

1. Introduction: overview, survival data layout, notations, functions in survival analysis, censoring mechanisms (Chapters 1-3)
2. Nonparametric survival curve estimates and inferences: Kaplan-Meier estimator, Nelson-Aalen estimator. (Chapters 4-6)
3. Two-sample test: logrank, stratified logrank and trend tests (Chapter 7)
4. The Cox proportional hazards model: partial likelihood, Wald, score and likelihood ratio tests, Breslow estimator, stratification (Chapters 8-9)
5. Cox regression model diagnostics: residuals, functional forms, outlying and influential cases, checking the PH assumption, model validation (Chapter 11)
6. Parametric regression models (Chapter 12)
7. Multivariate survival analysis: marginal approach, frailty models, counting process formulation, time-dependent covariates (Chapter 13)

Course Activities/Assignments:
The course will be taught with in-class instruction. Homework and computer projects will be assigned throughout the semester. We will also have midterm quizzes and a final exam. NO LATE COURSEWORK WILL BE ACCEPTED, EXCEPT EXTREME SCENARIOS.

Course Schedule:
01/21       Class starts
03/10-03/14 Spring Break
03/04       Class drop deadline
05/12 - 05/16 Final Exam Period

Grading Policy:
There will be a number of homework and computer project assignments and a final project. The assignments make up 50% and the final project makes up 15% to your final score. For the final project, you are given the freedom to select data from whatever field they are interested in. Students should make their own plans to locate or collect data, raise interesting research questions, and consult the instructor for the adequacy of the project. There will also be a few in-class quizzes or exams, which make up 40%. No make-up exam will be given and no late project submission is accepted without justifiable reasons.

Letter grades are determined according to the following scale:
Grade Score
A   90-100
B   80-89
C   70-79
D   60-69
F   <60

Make-up Policy: All other assignments must be turned in on time.

Attendance Policy: Class attendance is required and helpful to decide borderline grades. If a student has to be absent from a particular seminar, he/she will be responsible for catching up with course material.

Academic Integrity Policy: Please see http://academics.utep.edu/Default.aspx?tabid=23785
Civility Statement: This is a class where participation is required. You will be participating in classroom discussions. All students will be treated with respect.

Disability Statement: If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Military Statement: If you are a military student with the potential of being called to military service and/or training during the course of the semester, you are encouraged to contact me as soon as possible.