Survival Analysis

Math 5900 - Spring 2010

Instructor:	Yali Liu
Office:	Gilbreath Hall 308 - H
Office Hours:	TR 1pm - 2pm or by appointment
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Class Time and Place: TR 2:15 pm - 3:35 pm; Gilbreath Hall 205

Credits: 3

Prerequisites: Permission of the advisor or instructor

Textbooks:

1. *Survival Analysis: Techniques for Censored and Truncated Data* (2nd edition) by John P. Klein and Melvin L. Moeschberger. Required.
   Some data sets and SAS macros used in the book can be found from
   http://www.biostat.mcw.edu/homepgs/klein/book.html
2. *Survival Analysis Using the SAS System: A Practical Guide* by Paul D. Allison. Recommended. Data sets and macros used in the book can be found from
   http://www.sas.com/apps/pubscat/bookdetails.jsp?catid=1&pc=55233

Course Objectives: To present the basic concepts and tools in survival analysis. To introduce the survival analysis procedures available in SAS. At the end of this semester students will be able to:

1. identify when it is appropriate to use survival analysis methods
2. define censoring, survivor function, and hazard function
3. estimate the survival function for a follow-up study using different models
4. write computer programs in SAS to model survival data, perform hypothesis tests, and interpret output from these programs

Course Work:

- Homework problems will be handed out on most Thursdays and due one week late on Thursday. No late homework will be accepted but exceptions may be arranged if discussed in advance. When turning in your homework, each problem must be presented in order. This includes all relevant graphs and tables, which must be easily readable and appropriately labeled. You are limited to a maximum of 3 pages

per problem. Any graph or figure that is turned in without comments or spans across more than one page will be ignored. Please edit SAS output using a word processor or editor. The homework accounts for 25% of your final grade.

- Projects will be assigned and will be due in two to three weeks. There will be 2 projects on the same subject and a presentation on the total project at the end of the semester. Projects should be written up as a paper. All computer output must be inserted in the text. The projects account for 20% of your final grade.
- One mid-term exam (in-class) will be scheduled and the tentative date is March 4th. The exam accounts for 25% of your final grade.
- A comprehensive final exam will be held on Tuesday, May 4th, 2010. It accounts for 30% of your final grade.
- Exams are closed-book but you can bring a help sheet (double-sided) written by yourself (no copy or print). There will be no makeup of exams. Request for any exceptional arrangement must be made one week before the exams.

Grading Scale:

A	90 - 100	C	70- 79
B+	85 - 89	D	60- 69
B	80 - 84	F	≤ 60 or for academic misconduct

Attendance: You are expected to attend the lectures. You are responsible for any announcements and the material covered during the lecture.

Tentative course Schedule:

Chapters	**Description**	**Approx. time**
1, 3	Introduction	1wk
2, 3	Basic concepts & probability models	2wks
4, 7	Nonparametric estimation & hypothesis testing	3wks
12	Parametric models	3wks
8, 9, 11	Semiparametric models	3wks
6, 10, 13	Other topics	1wk

Extra References:

1. *Analysis of survival data* by Cox and Oakes. Always worth a read.
2. *Statistical Models and Methods for Lifetime Data* by J.F. Lawless. More technical.
3. *Statistical Methods for Survival Data Analysis* by Elisa T. Lee, John Wenyu Wang.
4. *Modelling Survival Data in Medical Research* by Collett. A good intermediate-level textbook on survival analysis.

SAS procedures: Proc Lifetest, Proc Lifereg, Proc Phreg.