

M21-618 Survival Analysis (Spring 2018)

Coursemaster: Ling Chen

Instructors: Ling Chen and Feng Gao

Semester & time(s): First half of Spring semester; two three-hour lectures per week

Schedule: Tue and Thur 1:30-4:30

Place: GEMS classroom, 3rd Floor, Old Shriners Building, 706 S. Euclid Ave

Credits: 3

Objective: This course will cover the basic applied and theoretical aspects of survival analysis techniques to analyze time-to-event data. Basic concepts will be introduced and topics include survival function, hazard function, censoring and truncation, Kaplan-Meier and Nelson-Aalen estimators, cohort life table, likelihood construction for censored and truncated data, estimating hazard and survival functions, Cox-proportional hazards (PH) model with fixed and time-dependent covariates and model selection. Additional topics will include regression diagnostics for survival models, the stratified PH model, parametric regression models and competing risk. Computer lab sessions are designed to provide intensive hands-on experience to analyze real life datasets.

Competencies / Expectations:

1. Recognize the important features of survival data, e.g. censoring and truncation.
2. Construct likelihood for survival data and conduct hypothesis testing
3. Determine the proper method in analyzing time-to-event data (e.g., parametric, semi-parametric or non-parametric method).
4. Understand the assumptions for the method chosen to analyze the survival data.
5. Perform survival analysis using SAS and interpret computer outputs.
6. Assess the quality of survival analysis conducted in published research papers.

Prerequisites: Biostat I and II, mathematical statistics (covers probabilities, distributions, likelihood, etc.), Calculus II or III and SAS programming. Or talk to the course master.

Format: Lectures, homework, quiz and two exams

Grade Criteria: 4 homework assignments, 2 quizzes (30%)
Midterm (35%)
Final exam (35%)

Textbook (Required): **Survival Analysis by John P. Klein and Melvin Moeschberger**

Date	Topic	Assignments	Lecturer
1/16	Survival Data and Basic Quantities	Hmwk 1 assigned	Chen
1/18	Censoring and truncation, likelihood construction		Chen
1/23	Nonparametric estimation for right censored data	Hmwk 1 due, Hmwk 2 assigned	Chen

1/25	Univariate estimation, cohort life table, quiz #1, assign paper reading#1		Chen
1/30	Hypothesis testing, paper reading#1		Chen
2/1	Computer Lab		Chen, Noor
2/6	Midterm	Hmwk 2 due	Chen
2/8	Semiparametric proportional hazards model, assign paper reading#2	Hmwk 3 assigned	Chen
2/13	Semiparametric proportional hazards model, paper reading#2		Chen
2/15	Time-dependent covariates, Refinements of proportional hazards model, quiz #2		Chen
2/20	computer lab	Hmwk 3 due, Hmwk 4 assigned	Chen, Jack
2/22	Regression Diagnostics		Gao
2/27	Parametric models		Gao
3/1	Advanced topics on survival analysis and review	Hmwk 4 due	Gao
3/6	Final exam		Chen

Noor Al-Hammadi and Jack Baty will assist in computer lab and Noor (noor@wustl.edu) will grade the homeworks.