

**CLRES 2023  
SURVIVAL ANALYSIS**

**Spring 2009**

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**COURSE DESCRIPTION & OBJECTIVES**

This course is designed for medical researchers with non-biostatistics majors. The course will focus on the basic concepts of survival (time-to-event) data analysis. The course objectives are to:

- recognize when it is necessary to account for time in the analysis of yes/no outcomes, and learn to appropriately summarize time-to-event data;
- understand different types of censoring, and learn to estimate and interpret survival characteristics.
- compare survival rates in different groups;
- assess the relationship of risk factors and survival times using the Cox regression model, and assess the appropriateness and adequacy of the model;
- understand issues in the design, analysis, and interpretation of studies involving time-dependent covariates;
- develop analytic skills through the analysis of data sets taken from the fields of medicine and public health; and
- develop oral and written communication skills through the description of analytic strategies and the summarization and interpretation of results.

**INSTRUCTORS**

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**TEACHING FELLOW**

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**MEETING TIMES & LOCATION**

**February 2– February 25 2009**

MW 1:00– 3:00pm  
200 Meyran Ave., Suite 222  
(Parkvale Building)

**CREDITS**

1 credits (8 contact hours/week for 4 weeks)

## GRADING

Letter grade based on

40%	Homework assignments
40%	Take-home final project
20%	Class participation

## TEXTBOOK

### Required

Kleinbaum, DG and Klein M. *Survival Analysis: A Self-Learning Text, 2nd Edition*. New York: Springer (2005).

### Optional

Cleves MA, Gould WW, and Gutierrez RG. *An Introduction to Survival Analysis Using STATA, 2nd Edition*. College Station, Texas: STATA Press (2008).

Both books are reserved at the CRTP library (contact [Jessica L Dornin](#) for details).

## REFERENCES

Rosner, B. *Fundamentals of Biostatistics, 6th Edition*. Pacific Grove, California: Duxbury (2006).

Collett, D. *Modelling Survival Data in Medical Research, Second Edition*. New York: Chapman & Hall (2003).

Hosmer, Jr, DW. and Lemeshow, S. *Applied Survival Analysis: Regression Modeling of Time to Event Data, 2<sup>nd</sup> Edition*. New York: John Wiley & Sons (2008).

Klein, JP, and Moeschberger, ML. *Survival Analysis: Techniques for Censored and Truncated Data, 2<sup>nd</sup> Edition*. New York: Springer (2003).

## COMPUTING PACKAGE

Stata 10, Stata Press, College Station, Texas ([www.stata.com](http://www.stata.com))

## LECTURE OUTLINE

Lecture 1 (2/2) Lin	Person-time data (I)– Rosner: Chapter 14.1-14.4
Lecture 2 (2/4) Lin	Person-time data (II)– Rosner: Chapter 14.5-14.7 Time-to-event data and basic terms – Kleinbaum: Chapter 1
Lecture 3 (2/9) Chang	Kaplan-Meier survival curves – Kleinbaum: Chapter 2
Lecture 4 (2/11) Chang	Comparing survival curves - Kleinbaum: Chapter 2 (continue)
Lecture 5 (2/16) Chang	Cox proportional hazards model - Kleinbaum: Chapter 3

- Lecture 6 (2/18) Cox model diagnostics – Kleinbaum: Chapter 4  
Chang Cox model with time-dependent covariates – Kleinbaum: Chapter 6
- Lecture 7 (2/23) Parametric survival regression models – Kleinbaum: Chapters 7  
Chang Recurrent events and competing risks – Kleinbaum: Chapters 8
- Lecture 8 (2/25) Course review

## **PROBLEM SETS**

The homework assignments are essential in learning the concepts of survival analysis. Trainees are encouraged to discuss and work together about difficult problems, but all trainees must write their own solutions.

Homework 1: due 2/11

Homework 2: due 2/18

Homework 3: due 2/25

## **FINAL PROJECT** (due March 13, 2009)

Trainees must work on the final project independently. Discussion, consulting, or working with other people are not permitted.

Data

Description

If there are any questions, please contact [Joyce Chang](#).

Last updated: January 7, 2009

## **OTHER LINKS**

- [Institute of Clinical Research Education](#)
- [University of Pittsburgh](#)