ST525: Applied Survival Analysis
Fall 2017

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Teaching Assistant: TBD

Course Credits
The class combines approximately 90 hours of instruction, online activities and assignments for 3 credits.

Prerequisites
ST516, ST517, ST518 or equivalent.

Course Description
ST525 aims to acquaint you with the statistical issues associated with understanding, analyzing and interpreting survival data or time-to-event data, which may be censored and/or truncated. Topics include:

- Basic concepts in survival analysis: censoring, hazard function and survival function
- Nonparametric one-sample estimator: Kaplan-Meier estimator
- One-, two- and k-sample hypothesis tests
- Parametric survival models
- Accelerated failure time model
- Cox proportional hazard regression model

The focus will be on applied problems, though some mathematical statistics is necessary for a solid understanding of the statistical issues. In addition, Statistical Software SAS will be used to illustrate and implement above statistical methods.

Learning Outcomes
Upon completion of this course, you should have gained a broader and deeper understanding of the subject, and developed the basic statistical skills to solve problems in survival analysis. In particular, you will be able to:

- Identify characteristics of survival data and understand classifications of censored and truncated data
• Define and understand basic concepts in describing survival data such as survival function, hazard function, relative hazard and cumulative hazard

• Perform and interpret univariate analyses of survival data using Kaplan-Meier estimator

• Perform and interpret k-sample analyses of survival data using logrank test

• Perform and interpret regression analyses of survival data using both parametric regression models and Cox proportional hazard model

• Carry statistical analysis in statistical software SAS

• Present and communicate, both orally and in written-form, the results of statistical analyses of survival data.

Learning Resources

All class materials will be posted online through canvas. The required textbook is *Survival Analysis Techniques for Censored and Truncated Data, 2nd Ed.*, by John P. Klein and Melvin Moeschberger, Springer-Verlag, 2003.

Tentative Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introductions to survival data analysis; functions of interest in survival analysis</td>
<td>TBD</td>
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<tr>
<td>Week 2</td>
<td>Censoring and truncation</td>
<td>TBD</td>
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<tr>
<td>Week 3</td>
<td>Parametric models; likelihood construction</td>
<td>TBD</td>
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<tr>
<td>Weeks 4-5</td>
<td>Univariate analyses of survival data</td>
<td>TBD</td>
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<tr>
<td>Week 6</td>
<td>K-sample hypothesis testing of survival data</td>
<td>TBD</td>
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<tr>
<td>Weeks 7-8</td>
<td>Accelerated failure time model</td>
<td>TBD</td>
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<tr>
<td>Weeks 9-10</td>
<td>Cox proportional hazard regression model</td>
<td>TBD</td>
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Evaluation of Student Performance

• Discussion boards. We will have weekly discussions on the course content material assigned during that week. The discussing board is an important way to interact with other students in the course, the TA and the instructor. As part of your course grade, you are expected to participate (in a substantive way) in the discussion boards each week. This can take the form of asking or answering questions about the course material, or simply writing a comment about something to make sure that you’re understanding a particular topic correctly. There is a separate discussion board set up for asking/answering “how to” questions about SAS.

• Homework. There will be regular homework assignments in this class. Your homework solutions need to be submitted through Canvas and will be graded. There will
be a closing time after which each homework assignment will no be accepted (i.e., you will no longer be able to submit through Canvas)—please be aware of these times! On the homework problems, it is fine to discuss them with your classmates on discussion board. You are expected to write up the solutions on your own in your own words.

- **Final project.** Final project will involve the analysis of a real survival data set and creating a report of your findings. More details will be given in week 5.

- **Course grade.** Discussion participation 20%; Homework 50%; Final Project 30%.

**Disability statement**

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

**Expectations for Student Conduct**

Student conduct is governed by the university’s policies, as explained in the Office of Student Conduct and Community Standards (http://oregonstate.edu/studentconduct/offenses-0).

**Academic integrity**

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit Student Conduct and Community Standards, or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student’s own efforts or the efforts of another.

b) It includes:

i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
iii) **ASSISTING** - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone’s grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

iv) **TAMPERING** - altering or interfering with evaluation instruments or documents.

v) **PLAGIARISM** - representing the words or ideas of another person or presenting someone else’s words, ideas, artistry or data as one’s own, or using one’s own previously submitted work. Plagiarism includes but is not limited to copying another person’s work (including unpublished material) without appropriate referencing, presenting someone else’s opinions and theories as one’s own, or working jointly on a project and then submitting it as one’s own.

c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University’s Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.