

**University of Florida College of Public Health and Health Professions**  
**[Fall 2009] PHC 6937: Applied Survival Analysis**

**Instructor:**

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**Class meeting time:** Tue. – Periods 4-5  
Thu. – Period 4

**Office hours:** Period 7 – MTWH  
Period 5 – H

**Description:** This course discusses “time to event” data, where the event can be response to treatment, relapse of disease, or death. Often we wish to quantify the relationship between the time to event and prognostic factors such as mode of therapy, age of patient, and severity of disease. This course will cover inference for a single population, methods for comparison of two or more populations, and methods for conducting regression analysis. Procedures will include the Kaplan-Meier estimator, the log-rank test, and Cox proportional hazards regression. All these procedures handle the common case of censored data, where the information on some individuals is incomplete in the sense that the event had not yet occurred at the termination date of the study.

**Prerequisites:** Students must have taken a course in regression modeling. Students must have access to a laptop with SAS for in-class use. Other general requirements for the public health program for computing requirements are found at <http://www.mph.ufl.edu/students/onlinecomputer.htm>.

**Course Objectives:** Students will be able to:

- Analyze and interpret survival data
- Understand the types of analysis and their uses
- Employ SAS to conduct analysis for survival data.

**Required Textbook:** Collett, D. *Modelling Survival Data in Medical Research, Second Edition*, 2003. Chapman & Hall. ISBN 1584883251

**Recommended SAS books:** A SAS reference guide of your choice, for example, *The Little SAS Book: A Primer* 4<sup>th</sup> ed. (2008), by Lora Delwiche and Susan Slaughter, or *Applied Statistics and the SAS Programming Language* (2005), by Ron P. Cody and Jeffrey K. Smith.

**E-Learning:**

An E-Learning site will be available for the course. Grades, discussion boards, and possibly other information will be available in the E-Learning system. E-learning is accessible at [lss.at.ufl.edu](http://lss.at.ufl.edu) or through [my.ufl.edu](http://my.ufl.edu). You must have a valid Gatorlink ID and password. For assistance, call the UF Help Desk at 392-HELP

**Grading:** Your grade in this course will be based on exams, quizzes, homework, and class participation. Total points earned will be based on the following:

- Exam I (25%)
- Exam II (25%)
- Homework (25%)
- Quizzes (20%)
- Class Participation (5%)

Class participation assessment will include attendance/tardiness, preparation for class, and participation in discussions.

The grading scale for this course consists of the standard scale, including minus grades, below. The conversion factors for grade point values assigned to each grade are also included (in parentheses):

93% - 100% = A (4.00)	73% - 76% = C (2.00)
90% - 92% = A- (3.67)	70% - 72% = C- (1.67)
87% - 89% = B+ (3.33)	67% - 69% = D+ (1.33)
83% - 86% = B (3.00)	63% - 66% = D (1.00)
80% - 82% = B- (2.67)	60% - 62% = D- (0.67)
77% - 79% = C+ (2.33)	Below 60% = E (0.00)

**Classroom etiquette:** Please come to class on time and be prepared to stay until the time scheduled as the end of class. Pagers and cell phones should not be used in class. The use of cell phones, text messaging, and pagers is a common complaint from students. Please turn them off. Or, if you expect urgent calls, set them to “vibrate.” Another common complaint is “side” conversations among students. Please consider that your conversation may interrupt the attention of someone seated near you. Generally, you should be speaking to the class as a whole or participating in group discussions as directed by the instructor. I welcome in-class questions. Your question will nearly always be one that other students also have.

**Class Attendance:** Class attendance is mandatory. Excused absences follow the criteria of the UF Graduate Catalogue (e.g., illness, serious family emergency, military obligations, religious holidays), and should be communicated to the instructor prior to the missed class day when possible. UF rules require attendance during the first two course sessions. Regardless of attendance, students are responsible for all material presented in class and meeting the scheduled due dates for class assignments. Finally, students should read the assigned readings prior to the class meetings, and be prepared to discuss the material except for the first class session.

**Policy on Make-Up Work:** Students are allowed to make up work ONLY as the result of illness or other unanticipated circumstances warranting a medical excuse and resulting in the student missing a homework or project deadline, consistent with College policy. Documentation from a health care provider is required. Work missed for any other reason will receive a grade of zero.

**Academic Integrity:** At the University of Florida, each student is bound by the academic honesty guidelines of the University and the student conduct code printed in the Student Guide and on the University website. The Honor Code states: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity." Cheating or plagiarism in any form is unacceptable and inexcusable behavior.

**My personal expectations and comments regarding academic integrity:** Students will often be encouraged to discuss the material with other members of the class on homework and other assignments. I believe we learn best when individual learning and group cooperation are present. However, I expect that no student will ever do any of the following:

- Have another person complete any assignment in this course
- Copy another student's work on any assignment in this course
- Use materials provided by a previous student in the course for any purpose
  - Do not seek to obtain or accept offers of such materials (delete any materials you obtained prior to the beginning of the course)
  - I will often provide exactly the same information (unless I have changed it for the better)
  - I will provide any information from past semesters that I feel will help you

I believe that one of the reasons academic integrity is becoming a large issue in colleges and universities is that, for whatever reason(s), students tend to be more concerned about the grade they will obtain in the course than they are interested in learning the material. I want to stress that in this class, if you focus on learning the material and worry less about the grade you will receive, you will be rewarded with knowledge that will be much more useful to you in the future than the difference between an A, B, or even C in this class.

**Accommodations for Students with Disabilities:** Students requiring accommodations must first register with the Dean of Students' Office. The Dean of Students' Office will provide documentation to the student who must then provide this documentation to the faculty member when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework. We all learn differently: however, if you have experienced problems in university classes with writing, in-class exams, understanding or concentrating in class; please talk to us or access a learning or education testing resource at the University or in another professional setting. For your assistance, should you need them, please consider either of the following:

University Counseling Services  
<http://www.counsel.ufl.edu/services.asp>  
P301 Peabody Hall – 392-1575  
Student Mental Health Services in the Student Health Care Center  
<http://www.health.ufl.edu/shcc>  
Room 245, Infirmary Bldg.- 392-1171

## Course Outline

<b>Topic</b>	<b>Reading</b>
Introduction to Survival Analysis	Chapter 1
<b>Chapter 2</b>	
Estimating Survivor and Hazard Functions	2.1-2.4
Estimating Percentiles	2.5-2.6
Comparing Two or More Groups	2.7-2.9
<b>Chapter 3</b>	
Proportional Hazards Model	3.1-3.2
Estimating Regression Coefficients	3.3
Confidence Intervals and Tests	3.4
Model Selection	3.5-3.6
Interpreting parameter estimates	3.7
Estimating the survivor/hazard functions	3.8
Proportional hazards and the log-rank test	3.9
<b>Chapter 4</b>	
Residuals and Assessment of Model Fit	4.1-4.3
Assumptions and Recommendations	4.4-4.5
Sample Size Requirements	Chapter 10
Accelerated Failure Time Model (Time Permitting)	Chapter 6