Instructor: Eben Kenah (ekenah@ufl.edu)
Assistant Professor, Department of Biostatistics

TA: Heather Lauritano (hlauritano@ufl.edu)

When: Tuesday 7th and 8th periods (1:55 – 3:50 pm) in Rolfs 205
Thursday 7th period (1:55 – 2:45 pm) in Pugh 120
Office hours by appointment

Objectives:
Survival analysis is about the analysis of time-to-event data. It is one of the most widely applied branches of statistics. In public health and medicine, it is the theoretical foundation for the design and analysis of cohort and case-control studies. The goal of this course is to help you understand the fundamental concepts of survival analysis and their applications in epidemiology. Basic concepts from probability and calculus will be reviewed as needed.

Calendar:

Aug. 23 Probability, random variables, distributions, and expectation & variance

30 Estimation of probabilities: Prevalence and incidence, LLN and CLT, calculus, and the delta method

Sept. 6 Fundamental concepts of survival analysis: Censoring, survival and hazard functions, failure-time distributions, and maximum likelihood estimation

13 Empirical CDF and the Kaplan-Meier and Nelson-Aalen estimators

20 Cohort studies, measures of association, and accelerated failure time models

27 Exam 1

Oct. 4 Log-rank test

11 Semiparametric relative-risk regression: the Cox model

18 Cox model: baseline hazard estimation and correction for ties

25 Building and interpreting regression models

Nov. 1 Residuals and goodness-of-fit for regression models

8 Exam 2

15 Confounding and stratification: Mantel-Haenszel and the stratified log-rank test

22 Stratified Cox models, case-control studies, and conditional logistic regression

29 Cox model extensions: Competing risks, recurrent events, and time-dependent covariates

Dec. 6 Additional topics and review; final exam distributed

13 Final exam due
Class format and website:
Tuesday will be two hours of lecture divided into four segments. Each segment will be approximately 20 minutes with 5 minutes for questions. There will be a fifteen-minute break between periods. You are encouraged to bring a hard copy of the lecture notes to class, and laptops are allowed.

Thursday will be a problem-solving session where we work on the problem sets. This will be crucial for reviewing concepts, learning to apply them, and preparing for the exams. Laptops are allowed.

Class website:
There will be a class website on Canvas. You will need to sign in with your Gatorlink ID and password. Lecture notes, announcements, and other files will be posted here. Technical issues can be resolved at the UF Helpdesk (http://helpdesk.ufl.edu) or E-learning Support (https://lss.at.ufl.edu/help.shtml).

Problem sets:
Problem sets will be given each week unless there is an exam. You are encouraged to work together, but you should write up your own results. They will not be graded, but they will important for learning the material and preparing for the exams.

Exams:
There will be two midterm exams and one final exam. The midterm exams will be in class with open notes. Calculators are allowed, but laptops and cell phones are not. The final exam will be a take-home exam. The exams will use problems adapted from the problem sets.

Readings:
There is no required textbook for the course. The primary readings will be lecture notes.


Software:
All statistical computing in the class will be done in R (https://cran.r-project.org/). An introduction to R is available online (https://cran.r-project.org/doc/manuals/R-intro.pdf). Many of the functions we use will be in the survival package (https://cran.r-project.org/web/packages/survival/survival.pdf). From within R, this can be installed using the command: install.packages(“survival”).

Grading:
15% Class participation
25% Exam 1 (in class September 27)
25% Exam 2 (in class November 8)
35% Final Exam (due December 13)
**Class attendance:**
Requirements for class attendance, make-up exams, and other work in this course are consistent with University of Florida policies at: [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)

**Accommodations:**
Students with disabilities requesting accommodations should first register with the Disability Resources Center (352-392-8565; [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)). Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Please register as early as possible in the semester.

**Online feedback:**
Students are expected to provide feedback on the quality of instruction in this course by completing the online evaluations at [https://evaluations.ufl.edu](https://evaluations.ufl.edu). Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at [https://evaluations.ufl.edu/results](https://evaluations.ufl.edu/results).

**University of Florida Honor Code**
UF students are bound by the Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.” On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code specifies a number of behaviours that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to the appropriate personnel. The full student conduct and honor code is at [https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code](https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code).

**U Matter, We Care**
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to many other helping resources including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.