

University of Florida
College of Public Health & Health Professions Syllabus
PHC6059: Introduction to Applied Survival Analysis (3 credits)
Fall: 2022
Delivery Format: *In-person*
Course Website: elearning.ufl.edu

Instructor: Dr. Matt Hitchings

Class Meetings: Tue 4:05-4:55pm (HPNP G-112)
Thu 3:00-4:55pm (HPNP G-112)

Office Number: 455 Dauer Hall

Phone Number: 352-294-1945

Email Address: mhitchings@ufl.edu

Office Hours: Tuesdays 2:00-3:00pm, or by
appointment

Preferred Course Communications:

- I will communicate class messages and announcements via Canvas
- If you have specific questions or issues of a personal nature, please communicate via email or through the Canvas inbox
- More general questions that may be of interest to others in the class can be communicated via the discussion board on Canvas

Prerequisites

Prior training in statistics (PHC 6052 or equivalent) and knowledge of multiple regression (PHC 6053 or equivalent). R programming experience will also be helpful.

PURPOSE AND OUTCOME

Course Overview

Survival analysis is about the analysis of time-to-event data. The goal of this course is to help you understand the fundamental concepts of survival analysis and their applications in epidemiology and biomedical sciences. Basic concepts from probability and introductory statistics will be reviewed as needed.

Relation to Program Outcomes

Survival analysis 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.

Course Objectives and/or Goals

Upon successful completion of the course, students should be able to:

1. Discuss the purpose and role of survival analysis in the field of Biostatistics
2. Utilize analytical methods to produce numerical and graphical summaries of time-to-event data
3. Conduct hypothesis testing to make inference on key survival analysis parameters
4. Formulate parametric and semi-parametric regression models for time-to-event data
5. Execute these functions in R software
6. Interpret results from studies in the literature that use survival analytic methods

Instructional Methods

Tuesday will be one period of lecture. Each lecture will review the material in that week's lecture notes. Students are expected to prepare by reading the lecture notes before class. Weekly quizzes due by 2pm on Tuesday will be used to assess comprehension of the week's material.

Thursday will be a two-period 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.

DESCRIPTION OF COURSE CONTENT

Topical Outline/Course Schedule

Week	Dates	Topic(s)	Assignments Due
1	8/22	Introduction to time-to-event data	8/23 – Q1 8/26 – PS1
2	8/27- 8/29	Key functions in survival analysis	8/26 – Q2 8/29 – PS2
3	9/3-9/5	Parametric survival distributions	9/2 – Q3 9/5 – PS3
4	9/10- 9/12	Kaplan-Meier and Nelson-Aalen estimators	9/9 – Q4 9/12 – PS4
5	9/17- 9/19	Log-rank test	9/16 – Q5 9/19 – PS5
6	9/24- 9/26	Midterm exam 1 review	9/26 – Exam 1
7	10/1- 10/3	Introduction to Cox proportional hazards regression	9/30 – Q6 10/3 – PS6
8	10/8- 10/10	Building Cox proportional hazards models	10/7 – Q7 10/10 – PS7
9	10/15- 10/17	Cox model extensions	10/14 – Q8 10/17 – PS8
10	10/22- 10/24	Residuals and model diagnostics	10/21 – Q9 10/24 – PS9
11	10/29- 10/31	Midterm exam 2 review	10/31 – Exam 2
12	11/5- 11/7	Alternative data structures in survival analysis	11/4 – Q10 11/7 – PS10
13	11/12- 11/14	Accelerated failure time models	11/11 – Q11 11/14 – PS11
14	11/19- 11/21	Survival analysis in clinical trials	11/18 – Q12 11/21 – PS12
15	11/26- 11/28	Thanksgiving – no class	None

16	12/3-12/5	Final exam review and reading day	None
Finals	12/9-12/13	Final exam	12/13 – Final exam

Course Materials and Technology

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

Good basic textbooks on survival analysis are: *Applied Survival Analysis, 2nd edition* by David W. Hosmer, Stanley Lemeshow, and Susanne May (Wiley-Interscience, 2008) and *Modelling Survival Data in Medical Research, 3rd edition* by David Collett (Chapman and Hall/CRC, 2014).

All statistical computing in the class will be done in R (<https://cran.r-project.org/>). The free Open Source Edition of RStudio (<https://www.rstudio.com/products/rstudio/>) is recommended for its easy to use graphical interface. 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")`.

For technical support for this class, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- <https://ss.at.ufl.edu/help.shtml>

ACADMIC REQUIREMENTS AND GRADING

Assignments

Problem sets are due on **Thursdays at 11:59pm** and consist mostly of statistical analyses performed in R, though there are also written questions (especially early in the semester). As indicated above, we will set aside time to work on these assignments during our scheduled course meetings. There are three take-home exams (two midterms and one final). Finally, there are short weekly quizzes to ensure everyone is keeping up with the lecture materials. These are due **Monday at 5:00pm** so that I can devote extra time in lectures to topics that are confusing. Note that we will often make significant progress on the problem sets in class, so the overall workload is intended to be very manageable.

Grading

The assessment will include class participation, two midterm exams, and one final exam. Students are responsible for all course material, including reading required materials prior to each class.

- 24% Problem Sets (12)
- 6% Quizzes (12)
- 40% Midterm exams (2)
- 30% Final exam (1)

The point system used for this course consists of the standard scale:

Points Earned	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	Below 60
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

Class Participation

Attendance at Tuesday lectures is not required but is encouraged. Attendance and participation at all Thursday sessions is required.

Please email the instructor as early as possible regarding potential excused absences from Thursday sessions. Please note all faculty are bound by the UF policy for **excused absences**. For information regarding the UF Attendance Policy see the Registrar website for additional details:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Students exhibiting superior engagement in the online discussion boards will respond to postings in a timely manner, engage in follow-up discussion, express their opinions clearly. A rubric for discussion board engagement is provided in Canvas.

Students exhibiting superior professionalism will be prepared for class, actively participate in class discussions and ask questions. The success of an active learning environment depends upon the engagement of students. A professionalism rubric is provided in Canvas.

Policy Related to Make-Up Exams

All students are expected to submit exams by the time communicated by the instructor. Make-up exams will not be considered except for an excused absence, per UF policy noted above. Students should contact the instructor as early as possible regarding a potential make-up exam.

Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail me within 24 hours of the technical difficulty if you wish to request a make-up.

STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT

Expectations Regarding Course Behavior

It's critical to review the weekly page in Canvas and read all announcements carefully. Each week's materials will be clearly identified on the course E-learning site. Students are expected to work through the material as scheduled. It is very important to work through all content contained on this site as directed and ask questions about the material you do not understand. Working through the content from start to finish is the best approach to achieve a high level of understanding and success in this course. In addition, it is your responsibility to review the comments and feedback we give on your graded assignments.

Communications Guidelines

Questions about course material should be asked during office hours or posted on the course discussion boards in E-Learning. Questions about specific quiz questions or issues of a personal nature should be sent by email through E-Learning. For questions asked Monday-Thursday, we will try our best to respond

within 24 hours. For questions asked Friday-Sunday, we will respond Monday or as soon as possible thereafter.

Academic Integrity

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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.”

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student

Website for additional details:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

<http://gradschool.ufl.edu/students/introduction.html>

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

Recording Within the Course

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons) including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be

subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Policy Related to Guests Attending Class:

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee (e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all courses. No further extensions will be granted. Please note that guests are not permitted to attend either cadaver or wet labs. Students are responsible for course material regardless of attendance. For additional information, please review the Classroom Guests of Students policy in its entirety.

Online Faculty Course Evaluation Process

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <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/>.

Healthy classroom

As students pursuing a path in the health professions or public health, it is crucial to demonstrate professional behaviors that reflect integrity and commitment to the health of patients, fellow health professionals, and to populations we serve. To accomplish this, a strong responsibility for the well-being of others must be evident in our decisions, along with accountability for our actions. Professionalism in the health disciplines requires adherence to high standards of conduct that begin long before graduation.

The following professional practices are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to protect the health and safety of ourselves, our patients, our neighbors, and our loved ones.

- If you are sick, stay home and self-quarantine. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated for testing and to receive further instructions about returning to campus.
- Continue to follow healthy habits, including best practices like frequent hand washing.

Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class. Hand sanitizing stations will be located in every classroom.

Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

SUPPORT SERVICES

Accommodations for Students with Disabilities

If you require classroom accommodation because of a disability, it is strongly recommended you register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class or as soon as you believe you might be eligible for accommodations. The Dean of Students Office will provide documentation of accommodations to you, which you must then give to me as the instructor of the course to receive accommodations. Please do this as soon as possible after you receive the letter. Students with disabilities should follow this procedure as early as possible in the semester. The College is committed to providing reasonable accommodations to assist students in their coursework.

Counseling and Student Health

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- You Matter We Care website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- Crisis intervention is always available 24/7 from:
 - Alachua County Crisis Center: (352) 264-6789
 - <http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

Inclusive Learning Environment

Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: www.multicultural.ufl.edu.