PH 716: Applied Survival Analysis, Spring 2026

Credits: 3
Meeting Times: Mon/Wed, 14:30—15:45
Location: Zilber 119

Instructor

Instructor name: Zhiyang Zhou
Instructor email: zhou67@uwm.edu
Office Hours: By appointment, typically on lecture days.

Welcome Statement

Welcome to Applied Survival Analysis! I'm excited to have you in this course and look forward to helping you build practical skills in working with time-to-event data. I understand that students come from different backgrounds and experiences, and my goal is to create a respectful, inclusive environment where you're encouraged to ask questions, explore ideas, and grow. Whether you're new to survival analysis or already have experience, I'm here to support your learning every step of the way.

Course Overview

This course provides a comprehensive introduction to survival analysis, with a focus on the statistical modeling and interpretation of time-to-event data. Students will gain hands-on experience analyzing censored using survival analysis methods implemented in R. The course emphasizes practical applications, including model selection, assumption checking, and interpretation of results in real-world contexts. Topics include nonparametric and regression-based survival models, visualization of survival outcomes, and effective communication of findings. By the end of the course, students will be equipped with the conceptual understanding and practical tools needed to apply survival analysis methods responsibly and interpret results in applied research settings.

Course Objectives

This course aims to:

- Introduce the fundamental concepts and statistical framework underlying survival analysis and time-to-event data.
- Develop students' ability to select, apply, and interpret survival analysis methods in applied research settings.
- Build practical experience in implementing survival analysis techniques using R.
- Emphasize critical evaluation of model assumptions, limitations, and appropriateness in real-world data.
- Strengthen students' skills in communicating survival analysis results clearly to both technical and non-technical audiences.
- Encourage thoughtful engagement with current literature and applied practices in survival analysis.

Student Learning Outcomes

By the end of the course, students will be able to:

- Explain key concepts in survival analysis.

- Apply appropriate survival analysis methods to real-world applications.
- Assess and diagnose model assumptions.
- Implement survival analysis techniques in R, including data preparation, model fitting, visualization, and result summarization.
- Interpret and communicate survival analysis results accurately using tables, figures, and written explanations.
- Critically evaluate applied survival analysis studies in literature.

Assessment

Students will be evaluated through regular assignments and a final project. All assessments are aligned with the stated learning outcomes and emphasize reproducible workflows, practical proficiency in survival analysis, and clear communication of results.

Prerequisites and/or Special Skills Required

Graduate students and [PH711(P) or PH715(P)] and [PH712(P)] or the consent of instructor.

Course Modality and Format

- **Format:** Lectures.
- **Modality:** In-person.
- **Detail:** Active participation during class time is essential, as learning will take place through live instruction, hands-on coding, group discussions, and collaborative problem-solving.
    - The instructor will lead live lectures and demonstrations during each class session, introducing new survival analysis concepts and working through R code examples in real time. Students are encouraged to ask questions, participate in discussions, and share screens when appropriate. Office hours (by appointment) will be held on lecture days to provide individualized support or address more in-depth technical questions.
    - Interaction with peers: Students will work in pairs or small groups during class to complete coding exercises, discuss methodological choices, troubleshoot analyses, and interpret results. Respectful and professional interaction is expected at all times during discussions and collaborative activities.
    - Interaction with course content: Lecture slides, notes, and code examples will be made available prior to each class session to support self-directed preparation. Students are expected to review these materials in advance so that in-person class time can focus on applied practice, clarification of concepts, and collaborative learning. Course content is reinforced through regular assignments and in-class applications, with independent practice encouraged to build proficiency in survival analysis and R.

Course Materials

- **Required readings:** Notes/slides regularly posted at the instructor's homepage and Canvas.
- **Recommended Readings:**
    - [DM] D. F. Moore. (2016). *Applied Survival Analysis Using R*. Cham: Springer Nature. (Accessible via UWM library.)
    - [KM] J. P. Klein & M. L. Moeschberger. (2003). *Survival Analysis: Techniques for Censored and Truncated Data*, 2nd Ed. New York: Springer.

Time Investment

This is a 3-credit course, which requires a minimum total time commitment of approximately 144 hours over the semester. This corresponds to an average of 9–10 hours per week across a 15-week term,

including both in-class and out-of-class activities. Each week, students should expect to allocate their time approximately as follows: 2.5 hours attending in-person lectures, 2–3 hours reviewing pre-posted lecture materials, reading relevant documentation or literature, and exploring example code, 4–5 hours completing assignments, practicing survival analysis in R, or working on the final project.

Technology Requirements

Each student is expected to have regular access to a computer with a reliable internet connection. This course makes extensive use of R (cran.r-project.org) and RStudio (posit.co/download/rstudio-desktop/#download). These tools are freely available for Linux, macOS, and Windows.

Assignments & Grading

Assignment and Grading Policies

- Bi-weekly assignments (60%): Short, focused exercises designed to reinforce weekly course concepts through hands-on practice. Assignments emphasize survival analysis methods, data preparation, model implementation, and result interpretation. These assignments provide formative feedback and support the development of practical proficiency and reproducible workflows.
- R package exploration (40%): Students will complete an individual final project that allows them to synthesize course material in greater depth. The project may take one of two forms: (a) an applied survival analysis using real-world data, or (b) a literature-based review focused on survival analysis methods or concepts. The final project evaluates students' ability to apply, interpret, and communicate survival analysis ideas clearly and effectively.

Grading Scheme

Assessment (Quantity)	**Point Value**
Bi-weekly assignments (6)	60
Final project (1) with two tracks: (a) applied survival analysis or (b) literature review focused on survival analysis methods or concepts	40
TOTAL	**100**

Grading Scale

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	0-59

Policies

Course Policies

- **Attendance Policies**: Though there is no penalty on absence, it is better to be present in the designated session punctually. Since the course will be delivered without any forms of recording, there is no alternative way of attendance.
- **Makeup or Late work.** No late submissions will be accepted. Timely submissions will be graded and returned within two weeks. Students with personal or medical emergencies should contact their instructor as soon as possible.
- **Academic Integrity Policy.** Academic integrity involves taking responsibility for one's own work, demonstrating honesty in academic efforts, and showing respect for the intellectual contributions of others. As members of the university community, all students are expected to understand and uphold these principles. The Joseph J. Zilber College of Public Health remains committed to maintaining high standards of academic integrity. Each student is expected to contribute to this commitment by avoiding academic misconduct, including but not limited to impersonation, plagiarism, and the use of unauthorized materials. In situations where expectations are unclear (such as whether collaboration, tools, or specific resources are permitted), seeking clarification from the instructor is encouraged. Asking questions reflects a commitment to integrity and a desire to engage responsibly with the academic process. Useful resources can be found at UWM information on academic misconduct. Also, please refer to CETL's tips on academic integrity in online learning for instructors and students.
- **Policy on Artificial Intelligence**. Students are permitted to use Generative Artificial Intelligence (GenAI) tools, such as Microsoft Copilot, to support their learning. These tools may assist with understanding course content, brainstorming ideas, and revising written drafts. However, final submissions for assignments and projects must reflect students' own work and should not be entirely generated by GenAI. If GenAI tools are used, proper citation is required. For guidance on citing AI-generated content, please refer to the resource on using and citing GenAI, provided by UWM Libraries. Taking credit for any work that is not original, whether in whole or in part, constitutes academic misconduct and may lead to disciplinary action under UWS Chapter 14. While GenAI can be helpful, it is essential to use them responsibly and ethically. AI-generated content may be biased, inaccurate, incomplete, or otherwise unreliable. Students must critically evaluate any output from GenAI before incorporating it into academic work.

University Policies

- **Statement on Hate/Bias Incidents:** UWM is committed to creating and supporting a campus climate that is respectful and supportive of all who study, live, or work on campus, or participate in campus activities. UWM students and employees who have been subjected to, or who have witnessed, an incident of bias or hate are encouraged to submit a hate/bias incident report. UWM can provide support or resources to those involved in the incident. Find more information about hate- or bias-motivated incidents, as well as UWM's Discriminatory Conduct Policy and other resources, on UWM's hate/bias webpage.
- **UWM Syllabus link:** The Syllabus Links page details policies pertaining to students with disabilities, absences due to religious observation, students called to active military duty, incompletes, discriminatory conduct, Title IX, academic misconduct, complaint procedures, grade appeal procedures, LGBT+ resources, and final exam policies.

Resources

Academic Supports

- Accessibility Resource Center (ARC): Dedicated to providing equal access for students with disabilities to UWM's academic, social, cultural and recreational programs. ARC offers academic accommodation supports and services such as note-taking, assistive technology and exam accommodations. Students who have, or think they may have, a disability are invited to contact ARC to arrange a confidential consultation. Also, students will be allowed to complete examinations or other requirements that are missed because of a religious observance or call to active military duty.
- Canvas Support: Visit UWM Canvas Student Support or reference the official Canvas Student Guide.
- Student Success Center: Student Success Center also offers one-on-one academic skills tutoring sessions to help students with time management and strategies for notetaking, studying, and test taking.
- UWM Libraries. Conduct your own research using a vast array of databases, seek help from librarians, reserve rooms for group projects, find a quiet study space, stop by the coffee shop.
- Writing Center. Meet confidentially, one-on-one, face-to-face or online in real time with writing specialists. Any subject, any project, any level.

Non-Academic Supports

Support U. Any student in need, or students that face challenges that are barriers to their education, are encouraged to contact the Dean of Students (dos@uwm.edu) for support. Support U offers wrap-around holistic support for students, including basic needs, accessing the food pantry, emergency funding, case management, and connecting to resources, etc.

- Emergencies: Includes crisis and after care, details on medical withdrawals, and UWM Police.
- Financial Resources: Links to Student Financial Services, scholarship information, emergency grants, and the food pantry.
- Health Resources: Medical and counseling services, community resource finder, the UWM Psychology clinic, survivor support and victim advocacy.
- Guidance and Consultation. Details on appeals, parking, accommodations, and mechanisms for filing grievances.

Technology Resources

- Student Technology Resources

Careers

- Student Experience and Talent

Centers for Advocacy & Student Engagement (CASE)

- First-Generation+ Resource Center
- LGBTQ+ Resource Center
- Military and Veterans Resource Center
- Women's Resource Center

Multicultural Student Centers (MSCs)

- American Indian Student Center
- Black Student Cultural Center
- Roberto Hernández Center

- Southeast Asian American Student Center

Student Involvement

- Event Calendar
- Student Association (Student Government)
- Student Involvement/Organizations
- Office of Undergraduate Research

Important UWM Dates

Spring 2026 Dates

First day of classes	January 26, 2026
Last day to add, change to/from credit/no credit audit status	January 30, 2026
Last day to drop without a "W"	February 22, 2026
Spring break	March 22—29, 2026
Last day to drop with a "W"	April 12, 2026
Last day of classes	May 13, 2026
Study Day	May 14, 2026
Final exams begin	May 15, 2026
Grade Deadline	May 29, 2026

Instructor statement of support

I recognize that this course may feel challenging at first. Working with time-to-event data and survival analysis methods takes time, practice, and persistence. Please do not hesitate to reach out if you are struggling, feeling stuck, or simply need guidance. I believe that every student in this course is capable of success, and I am committed to supporting your learning throughout the semester. I look forward to working together to make this a productive, respectful, and supportive learning experience.

Calendar

Topics	Delivery Date(s)/Due Date
Syllabus Review	January 27, 2026
Basic Quantities of Survival Models	January 27—February 12, 2026
Assignment 1	February 15, 2026
Nonparametric Survival Curve Estimation	February 17—February 26, 2026
Assignment 2	March 1, 2026
Nonparametric Comparison of Survival Functions	March 3—March 12, 2026
Assignment 3	March 15, 2026
Accelerated Failure Time Model	March 17—April 2, 2026
Assignment 4	April 5, 2026
Cox Proportional Hazards Model	April 7—April 16, 2026
Assignment 5	April 19, 2026
Diagnostics of Cox PH Models	April 21—April 23, 2026
Stratified Cox PH Model	April 28—April 30, 2026
Assignment 6	May 3, 2026

Extensions: Stratified Cox PH Model, Model Selection, Competing Risks, Random Survival Forest	May 5—12, 2026
Final Project	May 17, 2026