

Survival analysis project description

February 2025

1 Due date, submission instructions, grade breakdown

Report	Max Length (w/o refs)	Due date	Grade
Project proposal	1 page	3/03 11:59pm	5% of final grade
Final project report	8 pages	3/18 11:59pm	15% of final grade

The **final report** will be due on 3/18 at 11:59pm PT, and will be worth **15% of your final grade**. The **project proposal** will be due on 3/03 at 11:59pm PT, and will be worth **5% of your final grade**.

Submission of both will be through Gradescope, where I'll create new assignments for the proposal and the final project.

2 Project overview

The final project for this course is a 4 to 8 page report (not including the reference page(s)) focusing on one of several areas:

1. Data analysis
2. Methodology investigation
3. Pedagogical material

All projects should have some implementation in R Code. That makes RMarkdown a useful tool to use for this report.

If you are doing likelihood-based analysis for your project, you need to write down an expression for your likelihood.

2.1 Data analysis

In this route, you'll find a dataset that has a time-to-failure or time-to-event outcome. Examples of this include time to cancer remission, time to death after

a heart transplant, time to infection with a certain pathogen, time to marriage, time to bankruptcy, time to acquisition, etc.. It could be recurrent data, like time to tumor recurrence in a subset of patients who have had a tumor removed, or time to new product launch. You'll use a method we learned in class or an extension of the methods in class to analyze the data. You can approach this project in two ways: you could find an interesting dataset, and then think of a question that could be answered by analyzing the dataset, or you could think of a question you're interested in and look for data to answer the question. The first route is easier, but the second route is possible too.

2.2 Methodology

We've studied many different methods in survival analysis: parametric methods, nonparametric methods, many different hypothesis tests, and confidence intervals derived from these models, and model checking routines. If you like, you could do a deep dive on a methodology in one of these areas from a theoretical or simulation-study standpoint. If you go with this sort of project and you're doing a simulation study, make sure that you design your simulation study to have a high-enough power to detect whatever interesting thing you're investigating. This may require using the computing cluster. If you're doing a theoretical deep dive on the material, you'll also want to run a simulation study to ensure that your theoretical results hold in different scenarios.

2.3 Pedagogical material

If you're interested in learning more about a certain topic we covered in class or a topic you wished we had covered in class, you can develop pedagogical material related to this topic. The material should have some coding aspect to it because survival analysis is an applied discipline.

3 Project proposal instructions

Describe the project you plan to do using a maximum of one page. Be specific about what dataset you plan to use, what questions you want to ask, and the methodologies you think you might use. Please come talk to me about your idea if you have any questions.