Section 6.9: Survival Analysis and Censored Data

Duration: 2 hours

Concepts:

- Survival and censoring times
- Kaplan-Meier survival curve
- Log-rank test
- Hazard function
- The proportional hazards assumption
- The Cox proportional hazards model

Textbook section: An Introduction to Statistical Learning, Chapter 11

Materials and Resources	Learning Goals
● Computers for students with R Studio ● Survival analysis slides ● Survival analysis exercises R Markdown file	● Survival and censoring times ● Modelling survival time based on predictors ● Comparing survival time of multiple groups

Duration	Lesson Section	Learning Objectives
20 mins	Go through the “survival and censoring times” and “the Kaplan-Meier survival curve” sections.	● Survival time ● Censoring time ● Independent censoring ● Kaplan-Meier survival curve ● Kaplan-Meier estimator
10 mins	Go through “the Kaplan-Meier survival curve” section in the R Markdown file as a class.	● Using the `survfit()` function to fit a survival curve.
20 mins	Go through “the log-rank test” section.	● Compare the survival of two groups. ● The log-rank test for two groups.
10 mins	Go through “the log-rank test” section in the R Markdown file as a class.	● Using the `survfit()` function with a binary covariate ● Plotting two survival curves on one plot ● Performing a log-rank test with `survdiff()`
25 mins	Go through the “regression with a survival response" section.	● The hazard function ● The proportional hazards assumption ● The Cox proportional hazards model

15 mins	Go through "The Cox Proportional Hazards Model" section in the R Markdown file as a class.	• Compare the survival of two groups using a cox proportional hazards model fit with `coxph()` • Fit a cox proportional hazards model with multiple predictors • Plot multiple survival curves accounting for multiple predictors.