**Section 6.9: Survival Analysis and Censored Data in R**

**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 in R (2nd edition), Chapter 11

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| **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 |

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| **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. |