UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Survival and Longitudinal Analysis

2526-1-F8205B026

Learning objectives

1. **Knowledge and Understanding:**

The course aims to introduce statistical methods to analyse (1) survival data: univariate estimation of survival times, group comparions, semi-parametric and parametric models, , competing risks, quantile regressionstudy designs; and and longitudinal data of repeated continuous and discrete measurements, conditional and marginal models (fixed and random effects), GEE models, missing data.

2. **Applying knowledge and understanding:**

Based on the methods taught in class, the students will apply the statistical models for survival and longitudinal data using Stata (StataCorp), widely used in the field of epidemiology and biostatistics. Also aplications in will be briefly introduced.

3. **Making judgements:**

Having learnt methods and applications, the student will also show which methods and techniques are to be used given the study and the data at hand, by critically assessing the statistical and clinical implications of the models being used.

4. **Communication skills:**

The student will be able to explain how the methods can be applied and interpret the results in a clear and simple way.

5. **Learning skills:**

The students will learn how to analyse survival and longitudinal data from epidemiological and clinical studies, by understanding the methodology and by using Stata.

Contents

1. Survival Data Analysis: Introduction to Survival Data Analysis: Definitions. Censoring, Truncation, Survival Function, Hazard Function. Estimate and Comparison of Survival Curves. Cox Regression. Parametric Regression.
2. Introduction to longitudinal data: Summary Measure of Analysis of Longitudinal data. Modeling the mean response (analysis of response profiles, parametric and semi-parametric trends). Modeling the covariance. Linear mixed effects models.

Detailed program

1. Survival Data Analysis: Introduction to Survival Data Analysis: Definitions and examples. Censoring and Truncation. Survival Function, Density Function and Hazard Function. Estimate and Comparison of Survival Curves (Log-rank test, Wilcoxon-Breslow-Gehan, Tarone-Ware test). Cox Proportional Hazard Regression.

2. Introduction to longitudinal data: Summary Measure of Analysis of Longitudinal data. Modeling the mean response (analysis of response profiles, parametric and semi-parametric trends). Modeling the covariance structure (independence, exchangeable, unstructured, etc). Linear mixed effects models. Missing data in longitudinal studes.

Prerequisites

The course is offered in english, fluency in the english language is an important condition for successfully attending the lectures (listening comprehension and reading ability) and reading the additional material.

Teaching methods

In personal lectures, online meetings, use of Stata. Online meetings will be used to if teaching rooms are not avalaible.

Some videos will be uploaded.

Assessment methods

Final written exam with optional oral discussion.

1. The final exam will help to evaluate the student knowledge necessary to discuss the goal of the study being proposed to be analyzed using Stata, to run initial descriptive analyses, how to proceed with statistical inference and parameter interpretation, and overall model fitting.

2. The final score can change after the oral review.

Written exams are the same between attending and not attending students.

Textbooks and Reading Materials

1. Kleinbaum, D.G. and Klein, M. Survival Analysis, A self-learning text. (2013). Springer.
2. Fitzmaurice, G. M., Laird, N. M., and Ware, J. H. (2013). Applied Longitudinal Analysis, Chapman & Hall CRC.
3. Jewell, N.P. Statistics for Epidemiology. (2004). Chapman & Hall CRC.

Additional material is provided and made available in the course homepage

Semester

Second Semester: third term

Teaching language

English

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION