Censored Data and Survival Analysis (m62215p)

Instructor: P. BESBEAS

Elective Course, 4th semester, 5 ECTS units

Course level: Graduate (MSc)

Language: Greek (or English if foreign students attend)

Course Description
The survival and hazard functions are presented along with the likelihood function and its use in parametric and non-parametric (Kaplan-Meier) estimation. The concept of censored data is explicitly considered and modelled. Time to event data are analysed using parametric and semi-parametric approaches. The Cox proportional hazards model is utilised and appropriate residuals, including martingale, deviance and Schoenfeld are defined. The lasso-based extensions are defined and illustrated using the glmnet package. An introduction to competing risks and multi-state models concludes the course.

Prerequisites
Probability, Statistics and computational methods.

Target Learning Outcomes
Each student will become familiar with the basic principles of survival data, the Kaplan-Meier estimator, the concept of censoring and parametric modelling. They will be able to use the Cox model, select its variables and assess the model via the appropriate residuals.

Recommended Bibliography
Lecture notes and the “Applied Survival Analysis: Regression Modeling of Time-to-Event Data” Book by David W. Hosmer, Stanley Lemeshow, and Susanne May.

Teaching and Learning Activities
Weekly lectures and assignments. Detailed presentation of the relevant R code.

Assessment and Grading Methods
70% of the grade will be based on the final assignment which is based on the analysis of real time to event data and 30% of the grade is based on the assignments.