



DEPARTMENT OF MATHEMATICAL SCIENCES

MSA670 Logistic regression and survival analysis, 7.5 credits

Logistisk regression och överlevnadsanalys, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2019-02-06 to be valid from 2019-09-02, autumn semester of 2019.

Field of education: Science 100%

Department: Department of Mathematical Sciences

Position in the educational system

The course can be part of the following programmes: 1) Mathematical Sciences, Master's Programme (N2MAT) and 2) Bachelor's Programme in Mathematics (N1MAT)

Main field of studies

Mathematical Statistics

Specialization

A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

Knowledge corresponding to the courses *MMG200 Mathematics 1*, *MSG200 Statistical Inference*, and *MSG500 Linear Statistical Models*.

Learning outcomes

On successful completion of the course the student will be able to:

- Analyze regression problems with binary outcomes using logistic regression or Cox regression
- Deal with collinearity and interactions of predictors
- Describe basic concepts like odds ratios and hazards ratios
- Perform model checking in logistic regression and Cox regression

- Describe alternative approaches to the standard analyses
- Describe the concept of generalized linear models

Course content

The aim of the course is to provide the student with knowledge of statistical analysis with a binary response and multiple predictors. The methods presented are widely used in all research fields and particularly in medicine.

Topics covered in the course include

Logistic regression:

- Generalized linear models
- Odds ratios
- Hosmer-Lemshow test
- Confounding and interaction Connection to ROC-analysis, C statistic and related measures
- Ordinal logistic regression

Survival analysis:

- Definition of survival data; censoring och truncation and time dependency
- Estimation of the survival function and hazard function.
- Analyzing and evaluating Kaplan-Meier curves, log-rank test, Cox regression and parametric alternatives
- Alternatives to the proportionality assumption in Cox regression
- Methods for analysis of competing risks
- Introduction to frailty analysis for dependent data.

Form of teaching

Lectures, exercise sessions, computer sessions and projects with real data and medical researchers

Language of instruction: English

Assessment

Written exam, project reports and presentation.

If a student, who has failed the same examined element on two occasions, wishes to change examiner before the next examination session, such a request is to be submitted to the department in writing and granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In the event that a course has ceased or undergone major changes, students are to be

guaranteed at least three examination sessions (including the ordinary examination session) over a period of at least one year, though at most two years after the course has ceased/been changed. The same applies to work experience and VFU, although this is restricted to just one additional examination session.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Course evaluation

At the end of the course the students will be asked to answer a questionnaire.

The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.