

**MSA640, STATISTICAL ANALYSIS OF CATEGORICAL DATA, 7.5
credit points**

Level: advanced

1. Authorisation.

The course plan has been authorised by the vice-dean of the Department of Mathematical Sciences on November 09, 2006, to be valid from the same date.

Educational field: Mathematical Sciences

2. Educational context.

The course is part of the Master Program in Mathematical Sciences. It is also open for students outside the program who meet the course prerequisites.

3. Prerequisites.

Calculus-based probability and mathematical statistics will be used throughout. Students are expected to be familiar with basic statistical inference and to have taken some course in regression and analysis of variance, such as MSG500 Linear statistical models.

4. Learning outcomes.

The student shall understand the basic principles of categorical data analysis and the theory underlying the most common categorical-data models.

The student shall know how to conduct the statistical analysis for the common models using standard statistical software and how to interpret the results.

The student shall be able to generalize her/his knowledge to new models using basic probability calculations.

5. Course description.

Categorical data are special and need to be treated accordingly. On one hand the usual normal distribution methods apply only asymptotically, and on the other hand categorical data, being simple, gives an opportunity to use exact distributions. In this course the emphasis will be on parametric modeling of categorical data: properties of the multinomial distribution, goodness-of-fit measures, logistic regression, polychotomous regression, and loglinear models. Additional topics not

in the textbook will be briefly touched on at the end of the course. These topics include generalized estimating equations (GEE) and ML methods for generalized linear mixed models.

6. Literature.

Categorical Data Analysis by Alan Agresti (Second edition, 2002; Wiley) and hand-outs.

7. Assessment.

Home assignments and written final examination.

8. Grades.

The grade levels are Fail (U), Pass (G), and High Pass (VG). A wish for an ECTS grade should be reported to the examiner at the beginning of the course.

9. Course evaluation.

In the middle of the course the teacher arranges an oral feedback discussion with the students. At the end of the course the students are asked to answer an internet based questionnaire. The results of the questionnaire will be processed by the lecturer together with student representatives.

10. Additional information.