

MATH-449

Biostatistics

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Cursus	Sem.	Type
Ing.-math	MA1, MA3	Opt.
Mathematics for teaching	MA1, MA3	Opt.
Mathématicien	MA1, MA3	Opt.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Oral
Workload	150h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Remark

The course is given every other year. Cours donnés en alternance tous les deux ans

Summary

Biostatistics is about the application of statistics to medicine and the life sciences. The course covers various methods and problems that are typical for these areas of application. Despite the applied context, the course treats the topic at a fairly abstract level.

Content

- The analysis of counting data: estimate probabilities, transform probabilities, comparison of two frequencies, chi-squared statistics, binary regression, log-linear models, the test of Cochran-Mantel-Haenszel
- Meta-analysis: power of tests, combining evidence, inverse variance weights and meta-analysis, meta-analysis by variance stabilization, random effects v. fixed effects, publication bias
- Crossover studies
- Linear, mixed and generalized linear Models: longitudinal studies
- Survival analysis: regression models (accelerated lifetimes and proportional hazards), random effects

Keywords

see content

Learning Prerequisites**Required courses**

An introduction to statistics and probability

Recommended courses

Linear Models

Learning Outcomes

By the end of the course, the student must be able to:

- Choose an appropriate method for a given problem
- Apply the methods learned in the course

- Defend a data analysis he/she performed
- Critique published studies

Transversal skills

- Demonstrate the capacity for critical thinking
- Access and evaluate appropriate sources of information.
- Communicate effectively with professionals from other disciplines.

Teaching methods

Classroom lectures supported by the blackboard, occasional examples shown on the beamer, exercises in class and independent work.

Expected student activities

Participation in exercise sessions.

Assessment methods

Oral examination

Resources

Bibliography

A bibliography will be available on the moodle page of the course

Moodle Link

- <http://moodle.epfl.ch/course/view.php?id=14307>