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

Cours donnés en alternance tous les deux ans (donné en 2018-19)

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: estimating probabilities, tests and confidence intervals, comparison of two probabilities, the chi-squared statistic and Fisher's exact test, 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
- Analysis of survival times: likelihood for censored data, non-parametric estimates of the survival function, regression models
- Random effects: Linear, mixed and generalized linear Models for longitudinal studies,
- Additional topics: crossover studies, multiple comparisons

Keywords

see content

Learning Prerequisites

Required courses

An introductory course covering the basics of statistical theory and probability theory.

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, exercices in class and independent work.

Expected student activities

Participation in exercice sessions.

Assessment methods

Oral examination

Supervision

Office hours	No
Assistants	Yes
Forum	No

Resources

Virtual desktop infrastructure (VDI)

No

Bibliography

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

Moodle Link

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