

MATH-493

**Applied biostatistics**

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Cursus	Sem.	Type
Bioengineering	MA2, MA4	Opt.
Computer science	MA2	Opt.
Data Science	MA2	Opt.
Ing.-math	MA2, MA4	Opt.
Mathematics for teaching	MA2, MA4	Opt.
Mathématicien	MA2, MA4	Opt.
SC master EPFL	MA2, MA4	Opt.
Sciences du vivant	MA2, MA4	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	During the semester
Workload	150h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Courses	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

This course covers topics in applied biostatistics, with an emphasis on practical aspects of data analysis using R statistical software. Topics include types of studies and their design and analysis, high dimensional data analysis (genetic/genomic) and other topics as time and interest permit.

**Content**

- Types of studies
- Design and analysis of studies
- R statistical software
- Reproducible research techniques and tools
- Report writing
- Exploratory data analysis
- High dimensional data analysis (genetics/genomics applications)
- Additional topics as time and interest permit

Evaluation is based on written reports of biostatistical data analyses.

**Keywords**

Data analysis, reproducible research, statistical methods, R, biostatistical data analysis, statistical data analysis

**Learning Prerequisites****Required courses**

This course will be very difficult for students with no previous course or experience with statistics. **Previous experience with R is neither assumed nor required.**

**Recommended courses**

Undergraduate statistics course

**Learning Outcomes**

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

- Interpret analysis results

- Justify analysis plan
- Plan analysis for a given dataset
- Analyze various types of biostatistical data
- Synthesize analysis into a written report
- Report plan of analysis and results obtained

### **Transversal skills**

- Write a scientific or technical report.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Take feedback (critique) and respond in an appropriate manner.
- Use a work methodology appropriate to the task.

### **Teaching methods**

Lectures and practical exercises using R.

### **Expected student activities**

Students are expected to participate in their learning by attending lectures and practical exercise sessions, posing questions, proposing topics of interest, peer reviewing of preliminary reports, and interacting with teaching staff regarding their understanding of course material.

### **Assessment methods**

Evaluation is based on written reports of biostatistical data analyses.

Dans le cas de l'art. 3 al. 5 du Règlement de section, l'enseignant décide de la forme de l'examen qu'il communique aux étudiants concernés.