MATH-231 **Probability and statistics I**

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Cursus	Sem.	Type
HES - SIE	H	Obl.
Life Sciences Engineering	BA3	Obl.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Lecture	2 weekly
Exercises	2 weekly
Number of positions	

Summary

Introduction to notions of probability and basic statistics.

Content

- Descriptive statistics
- Combinatorics
- Probability density and cumulative distribution function
- Conditional probability and independence
- Law of total probability, Bayes' rule
- Discrete random variables, expected value and variance
- Discrete laws: binomial, Poisson
- Continuous random variables, expected value and variance
- Continuous laws: uniform, normal, exponential
- Transformations of random variables, standardization
- Joint distributions
- Central Limit Theorem
- Confidence intervals
- Maximum Likelihood estimation
- Introduction to hypothesis testing

Learning Outcomes

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

- Demonstrate understanding of course material
- Apply understanding to exercise/real life scenarios

Transversal skills

- Use a work methodology appropriate to the task.

Teaching methods

Lectures and group exercises

Expected student activities

Students should be prepared to participate in their learning by participating during lecture, asking questions, and contributing to exercise sessions

Assessment methods

Written

Resources

Bibliography

- A first course in probability (Initiation aux probabilités) / Ross
- Introduction à la statistique / Morgenthaler

Ressources en bibliothèque

- Introduction à la statistique / Morgenthaler
- Initiation aux probabilités / Ross

Moodle Link

- https://go.epfl.ch/MATH-231