

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
<b>Hours</b>	<b>4 weekly</b>
Courses	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**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](#)