

MATH-232

**Probability and statistics**

Berthier Raphaël Jean

Cursus	Sem.	Type
Communication systems	BA3	Obl.
Computer science	BA3	Obl.
HES - IC	H	Obl.

Language of teaching	English
Credits	6
Session	Winter
Semester	Fall
Exam	Written
Workload	180h
Weeks	14
<b>Hours</b>	<b>6 weekly</b>
Lecture	4 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

A basic course in probability and statistics

**Content**

Revision of basic set theory and combinatorics.

Elementary probability: random experiment; probability space; conditional probability; independence.

Random variables: basic notions; density and mass functions; examples including Bernoulli, binomial, geometric, Poisson, uniform, normal; mean, variance, correlation and covariance; moment-generating function; joint distributions, conditional and marginal distributions; transformations.

Many random variables: notions of convergence; laws of large numbers; central limit theorem; delta method; applications.

Statistical inference: different types of estimator and their properties and comparison; confidence intervals; hypothesis testing; likelihood inference and statistical modelling; Bayesian inference and prediction; examples.

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

Analyse I, II  
Algèbre linéaire

**Teaching methods**

Ex cathedra lectures, exercises and problems

**Assessment methods**

Written exam

**Resources****Notes/Handbook**

A photocopié of the course notes, with the problems etc., will be available.

**Moodle Link**

- <https://go.epfl.ch/MATH-232>

**Prerequisite for**

