

MATH-232

**Probability and statistics**

Abbé Emmanuel

<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Communication systems	BA4	Obl.
Computer science	BA4	Obl.
HES - IN	E	Obl.
HES -SC	E	Obl.

Language of teaching	English
Credits	6
Session	Summer
Semester	Spring
Exam	Written
Workload	180h
Weeks	14
<b>Hours</b>	<b>6 weekly</b>
Courses	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**

Mid-term and final exams

**Resources****Bibliography**

Ross, S. (2012) A first course in probability (9th edition). Pearson.

Aussi disponible en traduction française (PPUR): 'Initiation aux probabilités'.

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

**Prerequisite for**

Electrométrie, Théorie du signal, Télécommunications, Information et codage, Fiabilités, ...