EPFL

MATH-232 | **Probability and statistics**

Abbé Emmanuel, Berthier Raphaël Jean

Cursus	Sem.	Type
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
Hours	**6 weekly**
Courses	4 weekly
Exercises	2 weekly
Number of positions	

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, ...