

PROBABILITY AND STATISTICS



Niveau
d'étude
BAC +4



ECTS
7 crédits



Composante
UFR de
mathématiques
et
informatique
(UFR27)



Volume
horaire
84h



Période de
l'année
Automne

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Description

General Presentation: This course introduces the student to the fundamentals of rigorous probability theory.

Part 1: is intended to be an introductory course in elementary probability theory. Before introducing probability, it will look at the elementary set theory and combinatorial analysis. Then it will introduce the concept of a probability measure, sigma-algebras, and the axioms of probability. Students will study conditional probability and independence. Then students will define and analyze random variables in the discrete case, furthering this route by studying several usual discrete random variables. Finally, the course will present random variables in the continuous case, the usual continuous random variables.

Part 2: In this second part, we first study the joint distribution of pair of continuous random variables as an application of the change of variable theorem. Then, we introduce the notion of conditional distribution to define the conditional expectation in our setting. After that, we will study the convergence of sequences of random variables and, more precisely, the weak law of large numbers and the central limit theorem. Finally, as an application, we will introduce the primer of estimation theory studying, in particular, the method of moments and the maximum likelihood estimators.

Pré-requis obligatoires

Logic & Sets and Multivariable Calculus

Bibliographie

Textbooks: John Rice's Mathematical Statistics and Data Analysis book, 3rd edition. The 8 first chapters.