



## PROBABILITÉS STATISTIQUE

### PROBABILITY THEORY AND STATISTICS

Lecturers: Marie-Christophette BLANCHET, Céline HARTWEG-HELBERT

| Lecturers : 14.0 | TC : 16.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : FR

#### Objectives

This first part of the course deals with the modelling with random variables. We introduce the notion of density. Some methods of probability calculus, approximations and asymptotic theorems are studied. A important part of the course is devoted to the numerical simulation with MATLAB. The second part of the course deals with statistics. The notions of estimators and tests are introduced. A chapter is devoted to linear regression.

**Keywords :** Probability law, random variables, gaussian vectors, Monte-Carlo method, estimators, biais, statistic tests, linear regression.

#### Programme

Probability : (1) Random Variables (2) Mean and variance (3) Random vectors (4) Random variables sequences- Asymptotic results- Monte-Carlo method.

Statistic : (5) Estimation (6) Estimation by confidence intervalle (7) Statistic tests(8) Linear regression

#### Learning outcomes

- Be able to compute probabilities.
- Be able to simulate random variables with Matlab
- Be able to estimate some parameters of law from data.
- Be able to construct and analyse a linear regression.

#### Independent study

Objectifs :

Méthodes : On moodle: QCM, Reminders, Exercices on discrete random variables  
Exercices with solutions  
Exams of the past years

#### Core texts

Gilbert SAPORTA, *PROBABILITÉS, ANALYSE DES DONNÉES ET STATISTIQUE.* , Technip, 2011  
Jean-Pierre Lecoutre *STATISTIQUE ET PROBABILITÉS*, Coll. Eco Sup. Dunod, 2012  
Mario Lefebvre *PROBABILITÉS, STATISTIQUES ET APPLICATIONS*, Presse Internationales Polytechnique, 2011

#### Assessment

Final mark = 75% Knowledge + 25% Know-how  
Knowledge mark = 100% final exam  
Know-how mark = 100% continuous assessment