UCL Faculté des sciences économiques, sociales et politiques

ESPO

INGE1113   Probability

[30h+15h exercises] 4 credits

Teacher(s):	Michel Denuit, Léopold Simar
Language:	french
Level:	1st cycle course

Aims

Probability theory is a branch of mathematics allowing for describing and understanding random experiments. It is the key tool to measure and control the uncertainty inherent to the statistical reasoning. This course aims to develop the probabilistic theory for (countably or uncountably) infinite sample spaces, extending the methods presented in the former course devoted to descriptive statistics. Multivariate probabilistic models are also considered.
Emphasis is put on applications, with statistical procedures in mind. Simple examples demonstrate the usefulness of probability theory in sampling techniques and statistical inference.

Main themes

Part I:
Random variables (distribution function, mathematical expectation, uniform distribution, exponential distribution, normal distribution, binomial distribution, Poisson distribution)
Part II:
Random vectors (covariance matrix, linear combination, multivariate normal)
Part III:
Sampling theory (population, sample, sample average distribution, sample proportion distribution, law of large number, central limit theorem)

Content and teaching methods

Contenu et méthodes
The course is organised as follows:
- ex caethedra lessons
- practical sessions during which students are invited to solve exercises with the help of teaching assistants
- individual problem solving and complementary readings

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Course materials : Wackerly, D., Mendenhal, W. and R. Scheaffer (2002), Mathematical Statistics with Applications, Duxbury Press, New York, 6th edition (chapitres 1 à 7)

Other credits in programs

ACTU21MS	Première année du master en sciences actuarielles, à finalité spécialisée	(4 credits)	
INGE11BA	Première année de bachelier en ingénieur de gestion	(4 credits)	Mandatory