UCLouvain

lbir1212

2024

Probabilities and statistics (I)

4.00 credits	30.0 h + 15.0 h	Q1

Teacher(s)	Bogaert Patrick ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	Préalabre : LBIR1110 *The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.*
Main themes	Introduction to the calculus of probability - Discrete and continuous random variables: probability and probability density functions, expectations, variance and other statistical properties - Principal statistical distributions - Couples of random variables and random vectors: joint, marginal and conditional distributions, independence, covariance and correlation, expectations and conditional variance - Introduction to statistics - Notions concerning estimators and estimator properties - Inference about the mean and variance: estimators, sample distributions - Notions of one-mean-confidence intervals.
Learning outcomes	**At the end of this learning unit, the student is able to :** a. Contribution of this activity to the learning outcomes referential : 1.1, 2.1 b. Specific formulation of the learning outcomes for this activity A the end of this activity, the student is able to : · Name, describe and explain the theoretical concepts underlying the probability theory; · Use the mathematical expressions in a formal way and by using rigorous notations in order to deduce new expressions or requested theoretical results; · Translate mathematically textual statements using a rigorous mathematical and probabilistic framework by relying on appropriate concepts and theoretical tools; · Solve an applied problem by using a deductive approach that relies on a correct use of well identified properties and expressions; · Validate the internal consistency of the mathematical expressions and results based on theoretical properties and logical constraints that are induced by the probabilistic framework; 1
Evaluation methods	Evaluation: Open book written examination (only with the original material). The examination is composed of exercises to be solved. Its duration is about 3 hours.
Teaching methods	Regular courses and supervised practical exercises
Content	Notion of event and probability - Major theorems of probability calculus. Discrete and continuous random variables: probability and probability density functions, expectations, variance and other statistical properties. Major univariate statistical distributions. Couples of random variables and random vectors: joint, marginal and conditional distributions, independence, covariance and correlation, expectations and conditional variance. Introduction to random numbers and their applications.
Inline resources	Moodle
Other infos	The course relies on a book which is considered as mandatory and must be bought : P. Bogaert (2020). Probabilités pour scientifiques et ingénieurs (2nd ed). Editions De Boeck
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Environmental Science and Management	ENVI2M	4		
Interdisciplinary Advanced Master in Science and Management of the Environment and Sustainable Development	ENVI2MC	4		
Bachelor in Computer Science	SINF1BA	4	LINFO1111 AND LINFO1112	
Minor in Statistics, Actuarial Sciences and Data Sciences	MINSTAT	4		
Bachelor in Bioengineering	BIR1BA	4	LBIR1111	