UCLouvain

lstat2190

2026

Random vectors: modelling and processing

4.00 credits	15.0 h + 7.5 h	Q1

Teacher(s)	Kiriliouk Anna ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	Concepts and tools equivalent to those taught in the UE LSTAT2014: Elements of probability and mathematical statistics
Main themes	The course prepares students for the concepts of dependence via random vectors, multivariate and conditional distributions, covariance and correlation, multivariate normal distribution, and copulas.
Learning outcomes	
Evaluation methods	Written exam.
Teaching methods	Lectures supplemented by practical sessions (with theoretical exercises and computer exercises).
Content	Joint probability distributions: discrete, continuous Marginal distributions, conditional distributions Independence Covariance and correlation Moments (moment generating functions) Conditional moments (expectation and variance) Functions of random vectors, transformations Multinomial distribution Multivariate normal distribution: construction, properties Theory of multinormal: conditional normal, partial correlation, precision matrix, conditional independence Other dependence concepts: copulas
Inline resources	Slides on Moodle
Bibliography	Bain & Engelhardt (1992). *Introduction to probability and mathematical statistics (Vol. 4).* Belmont, CA: Duxbury Press. DasGupta (2011). *Probability for statistics and machine learning: fundamentals and advanced topics.* New York: Springer. Gut (2009). *An Intermediate Course in Probability.* Springer-Verlag (2nd edition).
Faculty or entity in charge	LSBA

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Data Science : Statistic	DATS2M	4		
Master [120] in Statistics: Biostatistics	BSTA2M	4		
Master [120] in Actuarial Science	ACTU2M	4		
Master [120] in Statistics: General	STAT2M	4		
Approfondissement en statistique et sciences des données	APPSTAT	4		
Certificat d'université : Statistique et science des données (15/30 crédits)	STAT2FC	4		