lstat2190
2024

Concepts and treatment of random vectors

4.00 credits	15.0 h + 7.5 h	Q1

Teacher(s)	von Sachs Rainer ;
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	Concepts of random vectors, multivariates moments and distributions, dependecies - preparing the student for the concept of dependence (prerequisite for many courses of the Master in Statistics)
Learning outcomes	
Evaluation methods	The exam will consist in a written exam, completed by a projet on simulations (with R).
Teaching methods	The material will be treated from a theoretical point of view, but also via examples and exercices (including simulations on R).
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	Moodle (copies of slides, ...)
Bibliography	Chapitres 4.1-4.4 et 4.7 , 5.1- 5.2 (5.3-5.4) du livre « Applied Multivariate Statistical Analysis » (W. Härdle, L. Simar ; Springer 2007) ; Chapitres 2.5-2.8, 3.5-3.6, 3.9-3.11 ; 4.1.4 et 4.3 du livre « Mathematical Statistics for Economics and Business" (R. Mittelhammer ; Springer 2013)
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 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		🔍