UCLouvain

lecge1101

2026

Statistics: theory and applications

6.00 credits	30.0 h + 30.0 h	Q2

Teacher(s)	. SOMEBODY ;Verardi Vincenzo ;
Language :	French
Place of the course	Louvain-la-Neuve
Learning outcomes	
Evaluation methods	The **assessment** consists of a **written exam** (closed book). This exam will cover all the material studied in class, both theoretical and applied. **Continuous assessment** will also take place during the year, allowing students to earn **up to two bonus points**.
Teaching methods	The course covers theoretical foundations with some practical applications in economics and management. No prior knowledge of programming is required. Teaching is structured around two complementary components: • **Lectures**: introduction to the fundamental principles of the methods, with illustrations of their application to empirical cases. • **Exercise sessions**: hands-on practice of the methods studied. The slides used during the lectures will be made available on Moodle. More specific references will be provided during the sessions or included directly in the slides.

Content	Non exhaustive list of content of the course
	• **Descriptive Analysis**
	  • Identify different types of data (qualitative, quantitative discrete or continuous).
	  • Use **measures of central tendency**: mean, median, mode, quantiles to summarize the data.
	  • Study variability with **measures of dispersion**: range, variance, standard deviation, coefficient of variation.
	  • Represent data visually: histograms, box plots, scatter plots, pie charts, etc.
	• **Bivariate Analysis**
	  • Study the relationship between two variables (qualitative or quantitative).
	  • Tools: contingency tables, correlation coefficients, simple regression lines, graphs (scatter plots, stacked bar charts).
	• **Fundamentals of Probability**
	  • Understand the construction and axioms of probability.
	  • Conditional probabilities and Bayes' theorem to incorporate new information.
	  • Concept of independence between events.
	• **Random Variables and Probability Distributions**
	  • Distinguish between discrete variables (e.g., binomial distribution, Poisson distribution) and continuous variables (e.g., normal distribution, exponential distribution).
	  • Study the properties of their distributions.
	  • Introduction to the **Central Limit Theorem**, the foundation of many statistical methods.
	• **Statistical Inference**
	  • Methods of point estimation (e.g., mean, proportion) and confidence intervals.
	  • Conduct hypothesis tests: comparing a mean or a proportion with a theoretical value.
	  • Understand the logic of statistical decision-making (Type I and II errors, p-value, significance level).

Inline resources	All slides presented in class will be made available through Moodle. Some additional specific references that may be of interest to students will be provided during the lectures or included in the slides.
Bibliography	**Dehon, Catherine**; **Droesbeke, Jean-Jacques et Vermandele, Catherine** (2015). *Éléments de statistique* (6# éd., collection Statistique et mathématiques appliquées, n° 6). Bruxelles : Éditions de l'Université de Bruxelles / Paris : Éditions Ellipses. 616–716 p. ISBN 978-2-340-00908-0.

Faculty or entity in charge	ESPO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Minor in Management (ESPO students)	MINAGEST	5		
Minor in Economics (open)	MINOECO	6		
Bachelor in Philosophy, Politics and Economics	PPE1BA	6		
Interdisciplinary Advanced Master in Science and Management of the Environment and Sustainable Development	ENVI2MC	6		
Minor in Mangement (basic knowledge)	MINOGEST	5		
Bachelor in Economics and Management	ECGE1BA	6		
Mineure en statistique et science des données	MINDATA	6		
Mineure en gestion	MINGEST	5		