UCLouvain

becge1132

2026

Descriptive Statistics and probability

4.00 credits	30.0 h + 22.5 h	Q2

Teacher(s)	Uyttendaele Nathan ;
Language :	French
Place of the course	Bruxelles Saint-Louis
Learning outcomes	**At the end of this learning unit, the student is able to :** The fundamental purpose of statistics is to derive results from a sample that are valid for the entire population. This inductive approach is called "Statistical Inference". In a preliminary stage, the sample must be simplified by representing it, without losing too much information, by means of graphs and tables that are as adequate as possible and reducing it to a few numbers that describe it. This is the role of Descriptive Statistics which constitutes the first part of the course. In order to go beyond the simple description of the sample and to draw valid conclusions about the underlying population, one must make additional hypotheses about the way in which the sample data were generated; this is the role of Probability Theory, which provides this indispensable tool for any inferential approach. This inductive approach introduces uncertainty; probability theory also allows us to attach a measure of reliability to any inferential conclusion. The second part of the course will therefore be an introduction to probability. The aim of the first part of the course is to familiarize students with the first tools of Descriptive Statistics; tools which they are confronted with on a daily basis, if only because of the media, which makes great use of them. Inaddition to its interest in describing a state of affairs or a sample, Descriptive Statistics provides an easy introduction to Probability Theory. The second part of the course aims at introducing the probabilistic reasoning mode. At the end of this course, students should be sufficiently comfortable in understanding and manipulating Descriptive Statistics and Probability (simple) to be able to take the Applied Statistics course in BLOC2; Descriptive Statistics and Probability are the first steps and are treated as such.
Evaluation methods	The evaluation will take place in June and in August, in person. It will consist of a written exam, with the use of a basic calculator (single-line display), without formula sheets, and with closed books. Solved examples from past exams will be available on the course's Moodle page starting from the first lecture. The exam format is designed to assess the student's mastery of the technical and computational aspects of the course, their rigor in this regard, their ability to interpret obtained results, and the quality of their reasoning. Such an evaluation not only tests the student's understanding of the course (grasping the concepts and their applications in exercises and being able to interpret results), but also requires the ability to go slightly beyond what has been covered in lectures and practical sessions, by their own initiative. In other words, students are expected to make the effort to take ownership of the course material in order to be able to use it effectively. The June and/or August exam will in no way be an identical replica of previous exams. Focusing exclusively on past exams and practical exercises will not be sufficient to pass this course.
Teaching methods	The lectures and practical sessions are delivered in person: a) The lecture provides a systematic introduction to the methodological foundations of descriptive statistics and the theoretical foundations of probability. It is accompanied by examples designed to illustrate this theory. Throughout the course and the practical sessions, particular effort is made to involve students in the development and discovery of new concepts and their applications. b) The practical sessions are based on numerous exercises taken from the reference book for this course. c) An active and participatory attitude in both lectures and practical sessions, as well as participation in any question-and-answer sessions, is essential; success in the course depends on it. Regular personal work (in particular, working through the proposed exercises) must be undertaken by the student from the very first week of classes. It is absolutely essential that students engage with the course rhythm from the beginning of the semester by attending lectures and practical sessions each week. Each student must therefore devote sufficient personal study time to ensure they understand and take ownership of the material, using the lectures, course slides, and teaching materials from the practical sessions. At the end of the semester, the period before the exam should not be a time of discovery but rather a period of revision of material that has already been understood and mastered. The personal work expected is by no means rote memorization. What will be assessed in the exam is not the student's ability to recite content, but their in-depth understanding of concepts and explanatory mechanisms, as well as their ability to apply them appropriately.
Content	The main course material consists of the reference book *"Notions de statistique"*, 3rd edition (green cover), written by Christiane Simard. The chapters covered in this book are chapters 1 to 3: • Descriptive statistics

	• Probability (terminology, basic properties, and combinatorial analysis) • Probability distributions (binomial distribution, Poisson distribution, normal distribution) Some parts of Chapter 4 may also be covered. Additional notes and slides prepared directly by your professor will also be made available online and will form part of the course. They cover so-called *"mathematical statistics"*, including: • Study of the fundamental mathematical properties of random variables (distribution function, density, expectation, variance, exponential distribution) • Discrete two-dimensional variables
Bibliography	- "Notions de statistique", 3ème édition (couverture verte), ouvrage rédigé par Christiane Simard <= la principale référence du cours - Comte M. et J. Gaden, Statistiques et Probabilités pour les sciences économiques et sociales, Collection Mayor, PUF, 1ère édition, 2000. - Wackerly D. D., Mendenhall W and R.L. Scheaffer, Mathematical Statistics with Applications, Duxbury Press, 7th ed., 2008. - Mendenhall W, Beaver R. J. and B. M. Beaver, Introduction to Probability and Statistics, Duxbury Press, 14 ed. 2012. - Ross S. M., Initiations aux Probabilités, traduction de la 4ème édition américaine, Collection : Enseignement des Mathématiques, Presses polytechniques et universitaires normandes. - Ross S., A first course in Probability, Pearson International Edition, 9th ed., 2013. ISBN-10: 1292024925. - Howell D. C., Statistique en Sciences Humaines (M. Rogier, traduction française), Edition Deboeck, 2008. Il existe une panoplie de livres en français comme en anglais qui reprennent cette matière de base de la statistique et qui sont assortis d'exercices résolus ou non. Certains se trouvent à la bibliothèque ESPO de l'université. De plus, Internet regorge de cours de statistique, plus ou moins poussés, et de documents expliquant des concepts ou des chapitres de ce cours. Une série de vidéos sur YouTube issues de la chaine "Chat Sceptique", permettent une approche aussi sérieuse que ludique de certains concepts statistiques. À certaines occasions, elles seront utilisées au cours-même.
Other infos	We strongly recommend that students acquire the course's reference book as soon as possible: *"Notions de statistique,"* 3rd edition (green cover), written by Christiane Simard.
Faculty or entity in charge	ESPB

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Economics and Management	ECGB1BA	4		
Bachelor in Economics and Management (French-English)	ECAB1BA	4		
Bachelor in Economics and Management (French-Dutch-English)	ECTB1BA	4		