



6.00 credits	45.0 h + 22.5 h	Q1
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Teacher(s)	Heuchenne Cédric ;
Language :	French
Place of the course	Bruxelles Saint-Louis
Prerequisites	<i>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.</i>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>Statistical techniques are used in many fields, particularly in economics. These techniques play an important role in achieving the objectives of each of the practical problems posed. It is the way of thinking, reasoning and calculation supporting this methodology that will be the focus of this course.</p> <p>Its purpose is to introduce the basic concepts that allow us to understand and formulate a statistical inference problem; in other words, it is about answering the question: "How can we learn by observing? To do this, we will seek to provide the tools to provide solutions to the most standard problems in statistics in its classical approach.</p> <p>This methodological course is intended to prepare students for other subsequent courses that mobilize these statistical concepts (e.g. courses in Econometrics, Data Analysis, Game Theory, etc.); courses that they will take mainly in their Block3 or Master's programs in Management Sciences or Economics.</p> <p>At the end of these 45 hours of courses, students should be familiarized with the fundamental concepts of statistics (sampling, point estimation, interval estimation and hypothesis testing). These concepts will have been illustrated in the following classical applications: ANOVA, linear regression, Chi-square tests.</p> <p>The aim is not to train future statisticians but to give students a solid training that gives them a technical and intuitive understanding of (basic) statistical analysis applied to economics and management. Students are expected to be able to interpret the statistical outputs of the various methods of estimation and the applications seen in the course, to have a critical mind in this respect and to formulate their questions when reading an economic study or in management using these inferential statistical approaches. It will be a question of mobilizing these techniques and interpretations in econometrics.</p>
Evaluation methods	<p>A test - or mock exam - will be organized at the beginning of December. It will allow students to identify their strengths and weaknesses in statistics. This mock exam will not only familiarize students with an online assessment on Moodle but will also prepare them well for the exams in the January and/or August session. Depending on the results obtained in the mock exam, they will be able to obtain 1 or 2 bonus points for their January and/or August exams. No mock exams will be organized during the summer before the last August session.</p> <p>The assessment will be done in January and August online on Moodle using integrated questions that allow for an examination as close as possible to the face-to-face exams. Thanks to its form, this type of online exam allows to assess the student's mastery of the technical and computational aspects of the course, its rigor in the matter, its ability to interpret statistical outputs and also to evaluate its reasoning. It is therefore not a multiple choice test with negative points that could be deducted with each error. The navigation mode of the test will be free (non-sequential). Such an evaluation not only questions the understanding of the course acquired by the student (understanding its concepts and their applications in exercises and knowing how to interpret the results) but also requires the ability to go a little beyond the material seen in the course and in the practical work by one's own means. In other words, it is a matter of making the effort to take ownership of the course material in order to be able to use it.</p> <p>During the evaluations, students will be able to use a form, statistical tables and their calculator (non-alphanumeric).</p> <p>Whenever possible, this online evaluation on Moodle will be done in the computer lab at the University of St. Louis with the student's computer. If a student does not have such equipment, they may request one from the University. Please note that this lesson plan is subject to change: as the course progresses, according to the dynamics with the students, and from year to year as the course is improved.</p>

Teaching methods	<p>The lecture and practical work will be given in distance learning; the lecture and the practical work will be the subject of video capsules and Chat (or Forum) on the digital platform Moodle to which the students are obligatorily registered. Communications and instructions related to the course and the practical work will be sent to the students from Moodle.</p> <p>a) The lecture is a systematic introduction to the theoretical and methodological foundations of statistical analysis; it is accompanied by examples mainly selected from the field of economics and designed to understand and illustrate this methodology as well as to apply statistical theory. Particular attention is paid to the increased use of statistics in attempting to solve and/or understand contemporary problems.</p> <p>A special effort is made throughout the course to involve students in the development and discovery of statistical concepts and their applications. Active participation in this learning should enable students to take full advantage of the practical work (TP) that complements the lecture and to be, from the outset, caught up in a research approach. Even if it allows access to various courses that will come later in the students' curriculum, this course is primarily designed to prepare students for the Block 3 econometrics course of their bachelor's degree.</p> <p>Active viewing of the lecture videos is a must. The videos of the lecture will be sent to the students via an announcement on Moodle so that they can view them during the hours scheduled for the Applied Statistics course in the official class schedule. The course is based on a very complete syllabus available to the students, which constitutes the pedagogical support of the course in addition to the videos.</p> <p>Every week, a Moodle Chat will be organized for students who wish to do so. This Chat will take place (in principle) at the end of the last class of the week to answer questions raised by the videos of the week and the syllabus.</p> <p>b) The practical work (TP) will also be organized remotely; it will be given by an assistant researcher in charge of this practical work (TP). They are based on a collection of exercises (in permanent improvement) available to the students. The assistant will agree on the modalities according to which he will organize the practical exercises (e.g. video capsules and/or a solutionary of the exercises etc.); he will answer the students' questions according to modalities that he will transmit to them (e.g. Chat or Moodle Forum or Teams or emails). These TPs summarize what has been seen in the previous course; they make it possible to verify if the knowledge has been acquired and to use it in the exercises that are proposed to the students. In order to make the most of each exercise session, the students must have previously reviewed the material covered in it by watching the videos of the course and working through the syllabus.</p> <p>c) Personal work</p> <p>Regular personal work is an essential part of passing the exam. As the course progresses, each student must devote sufficient personal study time to ensure that he or she understands the material. At the end of the semester, the period prior to the examination should no longer be so much a period of discovery as a period of review of previously understood material.</p> <p>Personal work must not be a memorization by rote of incomprehensible formulas. What will be evaluated in the exam is not the student's ability to restate, but rather his understanding of the concepts and explanatory mechanisms and his ability to use them.</p> <p>Other reference books, available at the University Library or online, are proposed to students, as a complement, for their more or less formalized aspect and/or for their range of exercises, solved or not.</p>
Content	<p>Reminder on Probabilities:</p> <ul style="list-style-type: none"> <li>• Bivariate random variables (Syllabus Chapter 4);</li> </ul> <p>First Part: Statistical Inference</p> <ol style="list-style-type: none"> <li>1) Sampling (Syllabus Chapter 5);</li> <li>2) Punctual estimation (Syllabus Chapter 6);</li> <li>3) Estimation through Maximum Likelihood Method (Syllabus Chapter 13); 4) Estimation by intervals (Syllabus Chapter 7);</li> <li>5) Hypothesis tests (Syllabus Chapter 8);</li> </ol> <p>Second Part: Applications</p> <ol style="list-style-type: none"> <li>1) Variance Analysis (ANOVA1/ANOVA2) (Syllabus Chapter 9)</li> <li>2) Linear adjustment (Syllabus Chapter 10)</li> <li>3) Simple Linear regression (Syllabus Chapter 11)</li> <li>4) Chi-Square Tests (multinomial Test, Adjustment Tests, Contingency Tables) (Syllabus Chapter 12).</li> </ol>
Bibliography	<p>- Wonnacott T. H. and R. J. Wonnacott, <i>Statistique: Economie - Gestion - Sciences - Médecine (avec exercices d'application)</i>, Paris, Economica, 4ème ed., 2000.</p> <p>- Wackerly D. D., Mendenhall W and R.L. Scheaffer, <i>Mathematical Statistics with Applications</i>, Duxbury Press, 7th ed., 2007.</p> <p>- Mendenhall W, Beaver R. J. and B. M. Beaver, <i>Introduction to Probability and Statistics</i>, Duxbury Press, 14 ed., 2012.</p> <p>- Mood A.M., Graybill F.A. and D.C. Boes, <i>Introduction to the Theory of Statistics</i>, Mc Graw Hill Ed., 1974. (<a href="http://www.colorado.edu/economics/morey/7818/MoodGraybillBoesBook/MGB3rdSearchable.pdf">http://www.colorado.edu/economics/morey/7818/MoodGraybillBoesBook/MGB3rdSearchable.pdf</a>)</p> <p>- Rohatgi V. K. and A. M. Md. Ehsanes Saleh, <i>Introduction to probability and Statistics</i>, Wiley- Interscience; 2d ed., 2000.</p> <p>- Tribout B., <i>Statistique pour Economistes et Gestionnaires</i>, Pearson Education France, Édition : 2e éd., 2013.</p> <p>- Rohatgi V. K. and A. M. Md. Ehsanes Saleh, <i>An Introduction to Probability and Statistics</i>, Wiley Series in Probability and Statistics, 3rd ed., 2015.</p>
Faculty or entity in charge	ESPB

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Economics and Management	<a href="#">ECGB1BA</a>	6	<a href="#">BECGE1132</a>	
Bachelor in Economics and Management (French-English)	<a href="#">ECAB1BA</a>	6	<a href="#">BECGE1132</a>	
Bachelor in Economics and Management (French-Dutch-English)	<a href="#">ECTB1BA</a>	6	<a href="#">BECGE1132</a>	