





Teacher(s)	Pircalabelu Eugen ;
Language :	French
Place of the course	Louvain-la-Neuve
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>1 The students will obtain knowledge about the basic concepts of nonparametric statistical inference. They will learn about elementary nonparametric testing procedures. They will be able to use these nonparametric procedures for analyzing real data, and this by using, for example, statistical software packages.</p>
Evaluation methods	<p>The evaluation for this class consists of three parts:</p> <ul style="list-style-type: none"> <li>• A project (written in French / English in min 5 and max 9 pages in the template on Moodle, annexes not included) of data analysis (30% of the points). The project is evaluated on the basis of the written report. The work includes, among other things, the application of non-parametric methods introduced during the course on real data and the use of statistical software to answer the questions asked. The project is to be solved individually or in groups of 2. A score will be awarded per group.</li> <li>• A written, closed book examination (50% of the points). This part of the exam is used to test your knowledge in terms of general understanding of the course (motivation and interpretation of procedures, choice of procedure to answer specific questions in practice, etc.), calculations on small samples, etc. A list of tables will be provided at the exam and at the start of the semester.</li> <li>• During the semester, the student must hand-in 2 compulsory assignments (short, 1 to 2 pages maximum per assignment), counting for 20% of the final grade. The homework is to be solved individually or in groups of 2. A grade will be awarded per group.</li> </ul> <p>The exact evaluation methods could be adapted according to the constraints linked to the sanitary conditions in force at the time of the exam sessions.</p>
Teaching methods	<p>The class consists of lectures (15h) and exercises sessions (5h). The classes and the TP are intended to be face to face. Teaching language: French.</p> <p>During the lectures we will explain for each of the statistical procedures the following : the motivation behind a test statistic, how to obtain the distribution of the test statistic under the null hypothesis, and how to construct the testing procedure. The aim is to get insight into nonparametric testing procedures and to learn about the different aspects of such procedures. At the end of the course the students have to work through some course work (a project) that will allow them to get more familiar with the use of nonparametric methods in practical applications, when for example analyzing real data.</p>
Content	<p>The class is focused on the presentation of key nonparametric concepts such as:</p> <ul style="list-style-type: none"> <li>• Hypothesis tests concerning location and dispersion of a population, given an i.i.d. sample</li> <li>• Detection of differences in location and/or dispersion between two populations</li> <li>• Goodness-of-fit tests for checking whether an unknown distribution belongs to a given parametric family of distributions, or equals a specific parametric distribution</li> <li>• Measures of association between two (or more) random variables</li> </ul>
Inline resources	<p>Moodle website of the class: LSTAT2140 - Statistique non-paramétrique : méthodes de base. <a href="https://moodleucl.uclouvain.be/course/view.php?id=10411">https://moodleucl.uclouvain.be/course/view.php?id=10411</a></p>
Bibliography	<ul style="list-style-type: none"> <li>• Gibbons, J.D. (1971). Nonparametric Statistical Inference. McGraw-Hill, New York.</li> <li>• Hollander, M. et Wolfe, D.A. (1999). Nonparametric Statistical Methods. Second Edition. Wiley, New York.</li> <li>• Lehmann, E.L. (1998). Nonparametrics: Statistical Methods Based on Ranks. Revised First Edition. Prentice Hall, New Jersey.</li> <li>• Maritz. J.S. (1995). Distribution-free Statistical Methods. Second Edition. Chapman and Hall, New York.</li> <li>• Mouchart, M. et Simar, L. (1978). Méthodes nonparamétriques. Recyclage en statistique, volume 2. Université catholique de Louvain, Louvain-la-Neuve, Belgique.</li> <li>• Randles, R. et Wolfe, D. (1979). Introduction to the Theory of Nonparametric Statistics. Wiley, New York.</li> </ul>
Faculty or entity in charge	LSBA

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Statistics: General	<a href="#">STAT2M</a>	4		
Master [120] in Mathematics	<a href="#">MATH2M</a>	4		
Master [120] in Statistics: Biostatistics	<a href="#">BSTA2M</a>	4		
Master [120] in Economics: General	<a href="#">ECON2M</a>	5		
Certificat d'université : Statistique et sciences des données (15/30 crédits)	<a href="#">STAT2FC</a>	4		