lstat2140
2020

Non parametric statistics

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

4 credits	15.0 h + 5.0 h	Q1

Teacher(s)	Pircalabelu Eugen ;
Language :	French
Place of the course	Louvain-la-Neuve
Aims	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. - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The evaluation consists of two parts: • A project (written in French / English in min 5 and max 8 pages in the template on Moodle, annexes not included) of data analysis (30% of points). The project is evaluated on the basis of the written report and on the basis of the answers in an oral presentation on the results and methodology used for the report, during the examination session. The work includes, among other things, the application of nonparametric methods introduced during the course on real data and the use of statistical software to answer the questions asked. The oral discussion also contains questions on the material presented during the semester. • A written exam (70% of the points), closed book. This part of the exam is used to test your knowledge in terms of general understanding of the course (motivation and interpretation of the procedures, choice of the procedure to answer specific questions in practice, etc.), calculations on small samples, etc. A list of tables will be provided. The failure of one of the two parts results in the automatic failure of the course! To be allowed to take part in the examination the student has to submit 3 compulsory homeworks (short, 1-2 pages maximum per homework). The homeworks are not graded as they are not part of the evaluation. Submission of less than 3 homework results in failure of the course!
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The class consists of lectures (15h) and exercises sessions (5h). Teaching language: French. 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.
Content	The class is focused on the presentation of key nonparametric concepts such as: • Hypothesis tests concerning location and dispersion of a population, given an i.i.d. sample • Detection of differences in location and/or dispersion between two populations • Goodness-of-fit tests for checking whether an unknown distribution belongs to a given parametric family of distributions, or equals a specific parametric distribution • Measures of association between two (or more) random variables
Inline resources	Moodle website of the class: LSTAT2140 - Statistique non-paramétrique : méthodes de base. https://moodleucl.uclouvain.be/course/view.php?id=10411

Bibliography	• Gibbons, J.D. (1971). Nonparametric Statistical Inference. McGraw-Hill, New York. • Hollander, M. et Wolfe, D.A. (1999). Nonparametric Statistical Methods. Second Edition. Wiley, New York. • Lehmann, E.L. (1998). Nonparametrics: Statistical Methods Based on Ranks. Revised First Edition. Prentice Hall, New Jersey. • Maritz. J.S. (1995). Distribution-free Statistical Methods. Second Edition. Chapman and Hall, New York. • Mouchart, M. et Simar, L. (1978). Méthodes nonparamétriques. Recyclage en statistique, volume 2. Université catholique de Louvain, Louvain-la-Neuve, Belgique. • Randles, R. et Wolfe, D. (1979). Introduction to the Theory of Nonparametric Statistics. Wiley, New York.
Faculty or entity in charge	LSBA

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Mathematics	MATH2M	4		🔍
Master [120] in Economics: General	ECON2M	5		🔍
Certificat d'université : Statistique et sciences des données (15/30 crédits)	STAT2FC	4		🔍
Master [120] in Statistic: General	STAT2M	4		🔍
Master [120] in Statistic: Biostatistics	BSTA2M	4		🔍