UCL Université catholique de Louvain

LSTAT2140

2013-2014

Non parametric statistics

4.0 credits	15.0 h + 5.0 h	1q

Teacher(s) :	Heuchenne Cédric (compensates Van Keilegom Ingrid) ; Van Keilegom Ingrid ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	The topics treated during this course are : - The location problem: one sample - Two independent samples: location and dispersion problems - Goodness-of-fit tests - Analysis of association (association measures) - Order statistics and linear rank statistics
Aims :	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".*
Content :	Content - 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 - The use of order statistics and rank statistics in nonparametric estimation and testing procedures Teaching methods 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.

Other infos :	Prerequisites Basic knowledge about probability and statistics: descriptive statistics, calculating probabilities, distributions, distribution function, probability density, means, variances (conditionally or not), linear regression, principles of parametric hypothesis testing Evaluation The evaluation consists of two parts: a project-work and an oral exam. The project concerns, among others, the use of nonparametric methods discussed in the course when analyzing real data, and the use of statistical software for getting answers to questions. A written report on the accomplished project and analysis of real data has to be provided. The oral exam consists also of two parts: questions about the project (defense of the project) and questions on the topics treated during the course Teaching materials There are course notes, as well as statistical tables for most nonparametric tests. Some material on statistical software packages for this course is also available. Teachers Professor: I. Van Keilegom, Tel: 010/47 43 30 Teaching Assistant: G. Geenens, Tel: 010/47 30 53 References 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. and Wolfe, D. (1979). Introduction to the Theory of Nonparametric Statistics. Wiley, New York.
Cycle and year of study :	> Master [120] in Statistics: Biostatistics > Certificat universitaire en statistique > Master [120] in Economics: General > Bachelor in Information and Communication > Bachelor in Philosophy > Bachelor in Pharmacy > Bachelor in Computer Science > Bachelor in Economics and Management > Bachelor in Motor skills : General > Bachelor in Human and Social Sciences > Bachelor in Sociology and Anthropology > Bachelor in Political Sciences: General > Bachelor in Mathematics > Bachelor in Biomedicine > Bachelor in Engineering > Bachelor in Religious Studies > Master [120] in Mathematics > Master [120] in Statistics: General
Faculty or entity in charge:	LSBA