lstat2180 *2020*	# Resampling methods with applications

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	*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.** An oral examination, where the instructors evaluate: • knowledge about the concepts seen in class throughout the semester (50% des points); • the quality of a project (written in French / English in min 5 and max 8 pages in the template on Moodle, annexes not included) of data analysis/simulation that ilustrates the bootstraap methods in a concrete case (50% des points). This written project will be handed in before the exam session and discussed with the instructors during the exam session. The evaluation of the project is based on the written manuscript and responses to questions in an oral discussion about the results and the methodology used for the report. 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: English.
Content	The class is focused on the presentation of key concepts based on resampling methods such as: • Basic ideas of bootstrap • Monte-Carlo methods • Applications to certain basic problems in estimation and inference • Bias/variance of an estimator • Confidence intervals • Hypothesis testing based on resampling • Theoretical properties of bootstraap • Bootstrap for regression • Iterated bootstraap • The jackknife • The "smoothed" bootstrap • Bootstrap for time series models
Inline resources	Moodle website of the class: LSTAT2180 - Méthodes de rééchantillonnage avec applications. https://moodleucl.uclouvain.be/course/view.php?id=8140
Bibliography	• Chernick, M.R. (2008). Bootstrap methods : a guide for practitioners and researchers, Wiley Series in Probability and Statistics. • Davison, A.C. et Hinkley, D.V. (1997). Bootstrap Methods and their Applications, Cambridge University Press. • Efron, B. et Tibshirani, R.J. (1993). An Introduction to the Bootstrap, Chapman and Hall. • Hall, P. (1992). The Bootstrap and Edgeworth Expansion, Springer. • Mammen, E. (1992). When does bootstrap work ? Springer.
Faculty or entity in charge	LSBA

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Data Science : Statistic	DATS2M	4		🔍
Certificat d'université : Statistique et sciences des données (15/30 crédits)	STAT2FC	4		🔍
Master [120] in Mathematical Engineering	MAP2M	4		🔍
Master [120] in Statistic: General	STAT2M	4		🔍
Master [120] in Statistic: Biostatistics	BSTA2M	4		🔍