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Seminar of statistical software (3ST2009)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en statistique	**Séminaire: 2 ph**	**Voir ci-dessous**	3

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Automne

Equipe enseignante

Dr. Alina Matei
Institut de statistique
Av. de Bellevaux 51 , CH-2000 NEUCHATEL
Office phone :+41 32 718 13 27 - email : alina.matei@unine.ch

Contenu

Use of two important softwares (R and SAS) from a statistical perspective.

1. An introduction to R
- The uses of R, R objects, vectors, matrices, lists, data frames.
- Looping, graphics, random numbers, functions.
- R packages.
- Simple examples of statistical analysis (simple linear regression, multiple regression, generalized linear models, anova).
2. An introduction to SAS
- The uses of SAS, SAS windows, and SAS language.
- Methods to input data into SAS, create and modify SAS data sets.
- Flow control statements, random numbers, specific procedures, macros.
- Simple examples of statistical analysis (simple linear regression, multiple regression, generalized linear models, anova).

Forme de l'évaluation

CA graded : Continuous assessment - one practical assessement within-semester and an end-of-semester practical examination (1:30 hours).

Reexamination next sessions, same year: 2 hours practical exam organized directly with the professor (not in Pidex, please contact the professor).
The practical exam will be organized by the professor in agreement with the student, before the end of the corresponding exam session (not in Pidex).

Details of continous assessment:

The course "Seminar of statistical softwares" is divided in two parts: one part dedicated to R and another one to SAS.

A) First attempt

Assessment criteria

1) The continuous assessment is also divided in two parts: one concerning R and one concerning SAS. Each part represents a mark which counts as 50% of the final grade. Thus, the final grade represents the mean of the two marks. If the solution of either of the two assessment parts is not provided to the professor, the corresponding mark will be 0. If neither solution is provided to the professor, the final grade is equivalent to a failure.
2) For the R part, the assessment consists of a homework. This homework will be given to the students right after the end of the R part through the platform "Moodle". The time to solve and return the homework solution to the professor by e-mail is (in general) two weeks. After this deadline, any return of the solution is not possible any more.
3) For the SAS part, the assessment consists of a practical exam to be taken in the computer room during (in general) the last course of the semester.
4) Both examinations will be evaluated from two points of view: the correctness of the solution and the statistical interpretation of the results. For example, if an exercise asks the students to perform a statistical test, the overall solution should include the R or SAS command to implement this test, but also the interpretation of the result.

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Deadlines

- The time to return the R homework solution is (in general) two weeks starting from the moment when the homework is provided to the students.
- The time to return the solution of the SAS part is at the end of the exam.
- In both cases, the solution will be returned to the professor by e-mail.

Attendance

The students must attend the SAS exam (in general, during the last course session of the semester). If a student does not attend the SAS exam, she/he will receive the mark 0 for the SAS part.

B) Second attempt

Retake exams
- Practical exam on computer concerning the two parts: R and SAS (2 hours practical exam).

Retake exam deadline
- The practical exam will be organized by the professor in agreement with the student, before the end of the corresponding exam session.

Documentation

For R:
- Peter Dalgaard, Introductory Statistics with R, Springer, 2002.
- Michael J. Crawley, Statistics, An Introduction using R, Wiley, 2005.
- Brian Everitt, An R and S-plus Companion to Multivariate Analysis, Springer, 2005.
- Julian J. Faraway, Linear Models with R and Extending the Linear Model with R: Generalized Linear, Mixed Effects and Nonparametric Regression Models, Chapman & Hall /CRC, 2004 and 2005.
- Colin Gillespie and Robin Lovelace, Efficient R programming, 2016, O'Reilly (see also https://csgillespie.github.io/efficientR/).
For SAS:
- G. Der and B. S. Everitt, A handbook of statistical analyses using SAS, Chapman & Hall / CRC, 2002.
- R. Cody, Learning SAS by Example: A Programmer's Guide, SAS Publishing; Pap/Cdr edition, 2007.
- M. G. Marasinghe and W. J. Kennedy, SAS for Data Analysis, Springer. 2008.

Pré-requis

Basic notions of probability and statistics, including statistical reasoning, statistical inference, and data analysis.

Forme de l'enseignement

- 3 ECTS credits
- Compulsory course for master in statistics
- Autumn Semester
- Course + practical exercises on computer: 90 minutes.

Objectifs d'apprentissage

Au terme de la formation l'étudiant-e doit être capable de :

- Compute statistical mesures
- Interpret a statistical output
- Develop computational skills
- Combine statistical and computational knowledge

Compétences transférables

- Select the "best" solution
- Explain the use of a method
- Analyse a statistical problem
- Communicate statistical results

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