

- Faculté des sciences
- www.unine.ch/sciences

### Seminar of statistical software (3ST2009)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
<b>Master en statistique</b>	<b>Séminaire: 2 ph</b>	<b>contrôle continu: 1</b>	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 Belleaux 51 , CH-2000 NEUCHATEL  
Office phone :+41 32 718 13 27 - email : alina.matei@unine.ch

#### Objectifs:

The seminar introduces two important statistical softwares: R and SAS. At the end of this seminar, the students should be able to use these two softwares, interpret and analyse an output.

#### Contenu:

1. An introduction in R
  - The uses of R, R objects, vectors, matrices, lists, data frames.
  - Looping, graphics, random numbers, functions.
  - R packages.
  - Simple examples of statistical analyses (simple linear regression, multiple regression, generalized linear models, anova).
2. An introduction in 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 analyses (simple linear regression, multiple regression, generalized linear models, anova).

#### Forme de l'évaluation:

CA graded : Continuous assessment - one practical assessment within-semester and an end-of-semester practical examination (2 hours).  
Reexamination next sessions, same year: 2 hours practical exam organized directly with the professor (not in Pidex).  
The practical exam will be organized by the teacher in agreement with the student, before the end of the corresponding exam session.

#### Details of continuous 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 teacher, the corresponding mark will be 0. If neither solution is provided to the teacher, 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 Claroline platform. The time to solve and return the homework solution to the teacher by e-mail is 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 the last course session 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

- Faculté des sciences
- [www.unine.ch/sciences](http://www.unine.ch/sciences)

### **Seminar of statistical software (3ST2009)**

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.

#### Deadlines

- The time to return the R homework solution is 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 teacher by e-mail.

#### Attendance

The students must attend the SAS exam (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.

##### Retake exam deadline

- The practical exam will be organized by the teacher 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.

##### 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:**

- Compulsory course for master in statistics
- Autumn Semester
- Course + practical exercises on computer: 2 hours