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Computational statistics (3ST2010)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en statistique	**Cours: 4 ph**	**Voir ci-dessous**	6

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

Période d'enseignement:

- Semestre Printemps

Equipe enseignante:

Dr.Alina Matei
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Av. de Bellevaux 51 , CH-2000 NEUCHATEL
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Objectifs:

Master the theoretical and practical aspects of the computer based methods in statistics. At the end, the students should be able to apply the methods presented in this course to their statistical analyses.

Contenu:

The course introduces a number of methods that make use of computer resources to do statistical analysis and modeling. Some of these methods use simulation based approaches to approximate standard errors, confidence intervals, p-values of statistical tests, etc. The course emphasizes the practical side of the methods, by illustrating the theoretical issues with practical applications using the R software. The course includes three parts:
- Random variable generation,
- Elements of Monte Carlo statistical methods,
- Resampling methods for estimating and testing (jackknife, bootstrap, resampling methods for model assessment and selection).

Forme de l'évaluation:

A) First attempt

CA graded: The assessment includes 4 parts: 3 tests on computer during the semester (1 hour for each test) and 1 project at the end of the semester (the project should be presented in the classroom during 15 minutes). Each part represents 25% of the final grade.

Attendance
The students must attend each of the previous 4 parts of the assessment.

B) Second attempt

Retake exams
- exam of 3 hours and 15 minutes.

Retake exam deadline
- The exam will be organized by the professor in agreement with the student, before the end of the corresponding exam session (not in Pidex).

Documentation:

- G. H. Givens, J. A. Hoeting (2007), Computational Statistics, Wiley.
- J.E. Gentle (2000), Random number generation and Monte Carlo methods, Springer.
- B. Efron, R. Tibshirani (1993), An Introduction to the bootstrap, Chapman and Hall.
- A.C. Davison, D.V. Hinkley (1997), Bootstrap Methods and their Applications, Cambridge University Press.
- C.P. Robert, G. Casella (2004), Monte Carlo statistical methods, Springer.

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Pré-requis:

Probability theory, inferential statistics, knowledge of R.

Forme de l'enseignement:

- 6 ECTS credits
- Elective course for master in statistics (choose 18/24 ECTS)
- Spring Semester
- Course+practical exercises on computer: 4 hours