- Faculté des sciences économiques
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Probabilistic Algorithms (3 ECTS) (5MI2007)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en méthodologie d'enquête et d'opinion publique	**Cours: 2 ph**	**cont. continu**	3
Master en statistique	**Cours: 2 ph**	**cont. continu**	3

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

Période d'enseignement:

- Semestre Automne

Equipe enseignante:

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Objectifs:

A student attaining this course should be able:
- to identify the randomized characteristic of an algorithm and to classify it as Monte Carlo or Las Vegas type
- to identify the parameters of an optimization problem (loss function, landscape, random noise)
- to select and to implement (using MATLAB environment) the appropriate stochastic algorithm for solving the optimization problem

Contenu:

The course starts with an introduction of the concept of randomized algorithms (examples, types) and of random number generators, but the core of the course provides a survey of many of the most important methods in stochastic search and optimization. This include the optimization heuristic approach (random search and non-linear simplex, simulated annealing, genetic algorithms and evolution strategies). Although the theoretical bases of the algorithms are presented in a rigorous manner, the proofs of these results are not included. The implementation of the enumerated algorithms, for solving the included application-oriented examples, is made in MATLAB.

Forme de l'évaluation:

- Lab assignments (individual exercises): 40% of final grade
- Written exam during the last week of semester (2 hours): 60% of final grade
- Resit: 2 hours written exam (autumn session): 100% of final grade

Documentation:

- Stochastic Optimization, J. Schneider and S. Kirkpatrick, 2006, Springer
- Introduction to Stochastic Search and Optimization, James C. Spall, 2003, John Wiley & Sons
- MATLAB doc, http://www.mathworks.com/access/helpdesk/help/techdoc/index.html