

- Faculté des sciences économiques
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Probabilistic Algorithms (6 ECTS) (5MI2008)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en informatique	Cours: 4 ph	cont. continu	5
Master en sciences économiques, orientation politique économique	Cours: 4 ph	cont. continu	6
Master en statistique	Cours: 4 ph	cont. continu	6
Master en systèmes d'information	Cours: 4 ph	cont. continu	6

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 an optimization problem where the measurements are affected by 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. The first part of the course will concentrate on optimization heuristic approach (random search and non-linear simplex, simulated annealing, genetic algorithms and evolution strategies - including ant colony and particle swarm -, whereas the second part is dedicated to stochastic approximation approach (finite difference method, stochastic gradient, simultaneous perturbations). 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: 40%
- Mid-term and final written exam (2 hours): 60%
- Resit: 2 hours written exam

Documentation:

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