- Faculté des sciences
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Large-scale Distributed Systems (3IN2032)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en informatique	**Cours: 2 ph** **Exercice: 2 ph**	**écrit: 2 h**	5

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

Période d'enseignement:

- Semestre Printemps

Equipe enseignante:

Dr. Etienne Riviere

Objectifs:

This course presents the paradigms, algorithmic techniques and design principles for large-scale distributed systems (LSDS) design. The focus of the course is on decentralized, autonomous and self-organizing systems. It favors practical case studies of state-of-the-art system designs from academia and industry.
The course covers: LSDS characteristics and requirements, gossip-based protocols, DHTs and other routing/querying substrates, distributed file systems and distributed data management, large-scale processing & MapReduce, multicast, publish-subscribe, and content-based routing.
A unique feature for a course on LSDS is the use of hands-on experimentation of a set of representative algorithms on a distributed testbed using real protocols deployments and no simulation. This task is made simple thanks to a specialized framework developed at the university and used by several research groups worldwide.
Evaluation: small projects reports, and final exam based in part on an industry system example.

Contenu:

On successful completion of this course, you will:
- understand the key paradigms and services that one can use to build scalable applications;
- understand the objectives of fault tolerance, load balancing and efficiency and what techniques are appropriate to achieve them;
- have a general knowledge of the existing solutions used at major companies such as Amazon, Yahoo! or Google, and understand why the traditional solutions are not effective anymore;
- have a practical experience in writing and evaluating code on a real large-scale testbeds, processing, presenting and discussing the results of your observation

Forme de l'évaluation:

mini-projects and final exam

Documentation:

no mandatory book. some research paper reading may be required during the course.

a publication about the course in a conference dedicated to distributed systems teaching can be found here:
http://cs.gsu.edu/~tcpp/curriculum/?q=advanced-technical-program

Pré-requis:

Mandatory: knowledge of imperative programming (e.g., C, Java, Python, Perl, etc.);
Recommended: prior course or seminar on small-scale distributed systems (distributed clocks, message passing, RPC, etc.)
Contact the instructor if you would like to know if your background is sufficient for the course.

Forme de l'enseignement:

Lessons and practical sessions using a dedicated systems for easy prototyping and evaluation