Big Data

Course title - Intitulé du cours	Big Data
Level / Semester - Niveau /semestre	M2 / S2
School - Composante	Ecole d'Economie de Toulouse
Teacher - Enseignant responsable	GADAT Sébastien
Other teacher(s) - Autre(s) enseignant(s)	
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Other teacher(s) - Autre(s) enseignant(s)	
Lecture Hours - Volume Horaire CM	15
TA Hours - Volume horaire TD	
TP Hours - Volume horaire TP	0
Course Language - Langue du cours	Anglais
TA and/or TP Language - Langue des TD et/ou TP	Anglais

Teaching staff contacts - Coordonnées de l'équipe pédagogique :

1) Email address: sebastien.gadat@math.univ-toulouse.fr

2) Office number: MF 208

3) Office hour: will be scheduled after the lecture timetable is arranged.

4) Preferred means of interactions: all types of questions, comments and suggestions during and after the lectures and by email are highly encouraged and more than welcome.

Course's Objectives - Objectifs du cours :

This course is dedicated to machine learning methods for big data problems.

After a motivated introduction and some reminders optimization algorithms, we will emphasize several problems and algorithms

Lecture 1: Optimization with convex approaches

Lecture 2: High dimensional regression and the Lasso method

Lecture 3: Collaborative filtering and the netflix problem. How to fill the gaps?

Lecture 4: Mixture models and unsupervised classification problems

Lecture 5: Tree based methods and aggregation: random forests, boosting

Lecture 6: Sequential prediction with on-line methods

Prerequisites - Pré requis :

It is assumed that students have a working knowledge of statistics, R, and optimization.

Practical information about the sessions - Modalités pratiques de gestion du cours :

Laptops and tablets are accepted.

Students are expected to attend all the classes.

Grading system - Modalités d'évaluation :

The final score is built with the equal aggregation of two homeworks (team of 2 students max)

Bibliography/references - Bibliographie/références :

Slides on moodle

Efron and Hastie book