UE7 Optimization

Course title - Intitulé du cours	UE7 Optimization
Level / Semester - Niveau /semestre	M1 / S1
School - Composante	Ecole d'Economie de Toulouse
Teacher - Enseignant responsable	BLANCHET ADRIEN
Other teacher(s) - Autre(s) enseignant(s)	
Other teacher(s) - Autre(s) enseignant(s)	
Other teacher(s) - Autre(s) enseignant(s)	
Other teacher(s) - Autre(s) enseignant(s)	
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 :

email: Adrien.Blanchet@ut-capitole.fr

office: MF313

office hours: on Tuesday 2PM-3:30

Course's Objectives - Objectifs du cours :

The course will be an introduction to the theory of optimal transport with applications to economics.

Chapter 1: introduction to optimal transport

1. Monge and Kantorovich's problems.

Kantorovich's relxation problem

Kantorovich's duality

existence of solution to Kantorovich's problem

2. solution to Monge's problem

facts about convex analysis (convexity, subdifferentiability, conjugate function, lsc)

optimal transport for quadratic costs, Brenier's theorem

case of the real line

3. Geodesics

definition

geodesically convexity

convexity inequality

application to the uniqueness of ground states

application to functional inequalities

application to pdes (the minimising scheme)

Chapter 2: application to potential games

Beckmann's urban equilibrium model

existence and uniqueness of solutions

Prerequisites - Pré requis :

measure theory

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

No tablet, no laptop

Students are expected to be on time

Grading system - Modalités d'évaluation :

A midterm and a final exam.

Final grade 1/4*m+3/4*e

Bibliography/references - Bibliographie/références :

Villani, C. (2003). Topics in optimal transportation (No. 58). American Mathematical Soc..

Ambrosio, L., Gigli, N., & Savaré, G. (2008). Gradient flows: in metric spaces and in the space of probability measures. Springer Science & Business Media.

Santambrogio, F. (2015). Optimal transport for applied mathematicians. Birkäuser, NY.